DOCUMENT RESUME

ED 227 632 EC 151 082

AUTHOR Jablon, Ann, Ed.; And Others
TITLE Working Papers in Experimental Speech-Language Pathology and Audiology.
INSTITUTION City Univ. of New York, Flushing. Queens Coll. Dept. of Communication Arts and Sciences.
PUB DATE 82
NOTE 126p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC06 Plus Postage.
DESCRIPTORS Adults; Aphasia; *Communication Disorders; Downs Syndrome; *Echolalia; Elementary Secondary Education; Emotional Disturbances; Exceptional Child Research; Hearing Impairments; *Language Acquisition; *Speech Therapy

ABSTRACT

Five papers describe clinical research completed by graduate students in speech-language pathology and audiology. The first study examines the linguistic input of three adults (a mother, teacher, and clinician) to a language impaired 8-year-old. The clinician's approach, less directive than that of the other two, facilitated spontaneous speech and increased the child's verbal responses. Study 2 demonstrated that a 10-year-old with Down's Syndrome could learn metalinguistic skills (the ability to think about and reflect on language) in a clinical setting. The third study investigated the relationship between an audiological test battery and self-assessment of 36 hearing impaired adults (50-70 years old). In the fourth study, the echolalic behavior of a 10-year-old emotionally disturbed child was analyzed over a 3-month period. The final study reports on an investigation of communicative abilities of eight adults with aphasia. (CL)

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WORKING PAPERS IN EXPERIMENTAL SPEECH-LANGUAGE PATHOLOGY AND AUDIOLOGY

Speech and Hearing Center
Department of Communication Arts and Sciences
Queens College of the City University of New York

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VOLUME XI 1982

QUEENS COLLEGE

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DEPARTMENT OF COMMUNICATION ARTS AND SCIENCES

QUEENS COLLEGE SPEECH AND HEARING CENTER

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August 1982

We are pleased to be able to produce the eleventh volume of these Working Papers. Implemented as a means of getting our graduate students involved with the clinical process as a research endeavor, the visibility which these studies have had has been very gratifying.

As in the past, they are initial reports of clinically relevant studies. These studies are completed by our graduate students in partial fulfillment of the requirements for the Master of Arts degree.

Ann Jablon
Robert Rosenbaum
Joel Stark

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The Input of a Mother, Teacher and Clinician to a Language Impaired Child

Naomi Teitelbaum
Sima G. Wollner*

Abstract

This observational study was designed to investigate the nature of the linguistic input of three adults to a language impaired child and to observe how the communicative skills of the child change with respect to the differing input. A language impaired child was studied in three communicative settings representative of the child's daily environment namely, the clinic, home, and school while he was interacting and engaging in a conversational interchange with three adult participants - his clinician, mother, and teacher respectively. Three specific issues were addressed. First, we were interested in what differences could be described in the linguistic input of the mother, teacher, and clinician to the language impaired child. Second, we were interested in describing how the child responds to the different styles of adult input. Specifically, the question posed was how does the child's language vary in its form, content, use and conversational style when talking to the mother, teacher, and clinician. Third, we explored what type of input facilitates spontaneous talk in the language impaired child.

The adult input and the child's related output was analyzed according to its semantic and pragmatic features. Results indicated that the mother and the teacher had a directive, tutorial style in their interactions with the child. They controlled the social interaction by repeatedly requesting information from the child and initiating the topics of conversation. The clinician, however, adopted a non-directive style in her interactions with the child. She followed the child's lead in play, commented on the child's ongoing actions and activities, and assumed a more cooperative role in the social interaction. The study demonstrated that a non-directive style of interaction facilitated spontaneous talk and increased the child's verbal output.

One aspect of a context which contributes to the way a child uses language is the input of the adult. Various aspects of maternal input to normal children learning language have been the subject of recent investigations. Studies of mother-child interaction have focused on the various formal structures and syntactic features that the mothers employed, the different semantic relations and topically related utterances that the mothers expressed, and the functions that the mothers used to convey their communicative intent to their children.

In terms of the structure of language, researchers have demonstrated that mothers' speech to children is shorter, well formed, highly intelligible, syntactically less complex, and decreased in mean length of utterance (Snow 1972, Cross 1978, Newport et. al. 1977). Snow (1979) reports that

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adult utterances consist mainly of sentence fragments; specifically, utterances without verbs and repetition of phrases from preceding utterances. Phillips (1973) studied measures of vocabulary and found that the vocabulary of the speech addressed to children was more concrete and less varied. Semantic analyses of maternal input have revealed that child-addressed speech is very redundant consisting of repetitions and expansions which are topically and semantically related to the child's preceding utterance. In general, the topic of conversation between the mother and child relates to the 'here and now' and centers around the child's interests (Cross 1978, Newport et. al. 1977, Snow 1972, 1977). In terms of the functions of language used, researchers have found that mothers employ a directive style of interaction with their children and that their speech consists primarily of questions and imperatives used to request the child to say something or to act upon certain objects (Newport et. al., 1977, Corsaro 1979, Snow 1979).

Many researchers have examined the effect of input on the language learning process of the child. Newport, Cleitman, and Gleitman (1977) correlated maternal use of various syntactic forms with their child's acquisition of different syntactic elements. They found that the mothers' frequent use of noun phrases correlated with their child's learning of adjectives and qualifiers. They also found a signigicant correlation between the mothers' use of complete Yes/No questions in which the auxiliary element is in sentence initial position and their child's use of verbal auxiliaries.

Snow (1972) studied the effects of maternal input in terms of its semantic content on the language learning process of the child. She found evidence for a decrease in mothers' repetitions with increasing age of the child. Cross (1978) found many maternal speech variables to correlate significantly with the child's speech production and level of semantic comprehension. When the mother perceived that the child did not comprehend or respond to her utterance, she would expand or repeat the child's previous utterance or repeat her prior utterance. The mother's repetitions and expansions were semantically related to the child's utterances and matched the child's level of semantic development. These maternal utterances were related to child-initiated topics in the immediate situational context and served to clarify the child's communicative intent. When the child became more sophisticated, the adult introduced new topics and spoke of non-immediate events. Cross concluded that the degree to which the mother utterances were semantically related to the child's preceding utterance had the most significant positive effect on the child's rate of language acquisition.

It has also been noted that mothers employ various conversational styles which may affect the language learning process (Cross 1977, Snow 1979). For example, those mothers who follow the child's lead in the conversational interchange allowing the child to determine the topic of conversation and then expand and add to it tend to facilitate language growth in their children.

Moerk (1974) describes a style of interaction where the maternal input changes from that of a language teacher to a conversational partner with increasing language skills of the child. Between the ages of 1;9 and 2;4, the mother models and supplies the label of objects, situations, activities, and pictures for their children. At the next stage, the mother prods the child to spontaneously elicit the language forms through questions. If the child responds and encodes an answer, the mother will respond to the child by either imitating or expanding his utterance or offering corrective feedback in the form of phonetic, semantic, and grammatical corrections of the child's incomplete or incorrect statement. If the child offers no response, the mother will model the correct form for him. In the last stage, the mother functions less as a language teacher and more as a conversational partner. A conversation arises between the mother and the child consisting of question-answer exchanges between the two participants and includes descriptions of objects, events, and activities by the mother and the child.

Snow (1977) describes mothers' interactions with their children using a conversational model approach in which information is reciprocally exchanged between the child and the adult. She found that mothers follow the child's shift in the conversational topic and ask many questions in order to encourage the child to take a turn in the conversational interchange. The mean length of the maternal turn decreases as the child becomes a more active participant in the interaction by responding to maternal utterances and initiating more interactions.

Speech addressed to language impaired children has been found to be significantly different from adult input to normal children learning language. It is important to note that many studies reporting these differences have matched the children according to chronological age. There is some evidence that when normal and language impaired children are matched according to linguistic level, no differences exist in terms of the adult's speech. For example, Rondall (1977) matched normal and mentally retarded children on language level. She found that maternal speech addressed to normal and Down's Syndrome children matched for M.L.U. varied with the child's increasing language level and M.L.U., but no interactive effects relating to the type of child were found. Specifically, she found that maternal speech addressed to normal and retarded children did not differ in syntactic, semantic, pragmatic and language teaching aspects of speech. Apparently, parents modify their speech based on the child's language level and this factor rather than the child's language disorder is an important variable in determining the adult input to the child.

Turning to the differences noted in adult input to normal and language impaired children, researchers have found that the speech addressed to language impaired children differs in terms of syntactic variables from the speech addressed to normal children of the same chronological age.

Adult input to the language disordered child was found to be more fluent and was characterized by a lower mean length of utterance, shorter and less complex sentences, less varied linguistic information, less frequent vocabulary diversity, and a greater amount of verbal output (Cramblit and Siegal, 1976; Stein, 1976).

Researchers have also studied the functional aspect of maternal speech and the conversational style employed when the mothers were interacting with their language impaired children. Adult input to the language impaired child included many more commands, fewer comments on ongoing activities, and a large number of questions often presented in complex syntactic forms which the child was unable to respond to (Giattino, 1980; Grossfeld and Geller, 1980; Stein, 1976).

In terms of the interactive patterns of parents of language disordered children, styles of interaction have been found to differ significantly from the interactive patterns of the parents of normal children. Whereas the parents of the normal children acted more as conversational partners (Cross, 1977; Snow, 1977, 1979; Moerk, 1974), Stein (1976) found that the parents of the language disordered children assumed a more tutorial role in interacting with their child. This is apparent by their extensive use of commands and directives, simple repetitions mainly of the imperative type, focusing utterances, Yes/No questions designed to elicit information or direct the child's behavior, and syntactic expansions which served to transform the child's fragmented utterances into the correct adult form. It appears then that the parents of language disordered children serve more as language teachers rather than as conversational partners and are primarily concerned with teaching the child linguistic forms and focusing the child's attention.

Giattino (1980) also found that the parents of language impaired children use language to control their child rather than to foster communicative interaction. The author reports on a case study in which a mother was insensitive to the linguistic level and communicative needs of her language impaired child. This mother initiated the topic of conversation, usurped conversational turns, interrupted the child, and did not attend to the child's response. This pattern of interaction does not allow the child to initiate a topic change, limits the child's verbal output, and reduces his chances of being an active and dynamic participant in the conversation.

Wulbert et. al. (1975) noted marked differences in the interactive patterns of parents of normal and language disordered children. Parents of normal children tended to spend more time playing with their children and encouraging them to learn new things in contrast to the parents of the language disordered children who interacted very little with their children and were primarily interested in taking care of their child's physical needs. In order for the adult input to be effective, it must consist of a "dynamic verbal interchange" between the two participants where the mother positively responds to the child's utterances and modifies her input to fit the child's communicative and linguistic needs. Apparently, this form of dynamic interaction was absent between the mother and the language disordered child, where the child was a source of frustration for the mother and the mutual interaction was subsequently not pleasurable for both participants.

Most of the research on child-directed speech deals with adult input to a child in a one to one situation. Some researchers have started to investigate the input of the adult to the child in a group situation. Snow (1979) found marked differences in adult-child interaction in a group and home situation. She studied the frequency and length of adult interaction with two children at home and in a group situation, (i.e., day care center) and observed who was the initiator of these interaction periods. She found that the adults interacted more with the child at home than in the group situation where the child played either alone or with other children. The child's interaction with the adult in the group situation depended on his ability to initiate these interactions in contrast to the home situation where the mother was responsive to the child and eager to interact with him. The author concluded that there were different patterns of adult-child interaction in a group and home situation and that, to a large extent, the child's personality determined the degree to which the adult interacted with him in a group situation.

A recent area of investigation dealing with adult input to children in a group situation focuses on the input of the classroom teacher to the child. Silliman and Leslie (1980) analyzed the input of a regular and special education teacher in terms of the discourse patterns they employed during teacher-child interactions. They studied the various components of conversation between the teacher and the child in the classroom setting and analyzed conversational sequences across three dimensions; its structure, relating to the formal organization of conversation in terms of turn-taking; its function, referring to the communicative intent conveyed by the speakers; and its content, relating to how the participants deal with meaning in the conversation by initiating and maintaining conversational sequences. In terms of the structural component of conversation, the authors found that the special education teacher formally controlled speaker selection, demanding the child to raise his hand in order to take a turn in the conversation. The regular classroom teacher, however, allowed the children to take a turn without formally requesting it. The regular class teacher also permitted the children to discuss the selected topics together as a group, as opposed to the special education teacher who allowed much less communicative interaction among the children.

In terms of function, the authors found that both teachers expressed similar communicative intentions. Specifically, the function most frequently used by both teachers was request for information, designed to obtain information from the child to which verbal compliance was obligatory. This conversational act gave the teacher full control over the communicative exchange and served to maintain the role of differentiation between the teacher and the child. Differences were noted, however, between the teachers in terms of the kinds of information requests selected. The special education teacher's request for information were product or item oriented designed to elicit specific information from the child relating to objects and events in the discourse. This type of question required only a one-word response from the child and limited the child's verbal output. The regular class teacher's request for

information were process oriented, requiring the child to infer cause and effect relationships and utilize analytic thinking in his response. Here, the child's response consisted of a more elaborated use of language form and content. Analysis of the content component of conversation revealed that the special education teacher failed to establish a shared topic context with the child resulting in non-productive discourse, in contrast to the regular class teacher who established shared topic reference with the child. The authors suggest that the child's verbal output may be a reflection of the various conversational components of the teachers' input in the discourse.

Blank, Rose, and Berlin (1978) maintain that the language of instruction varies minimally in terms of the form and function of language used by the teacher. In other words, the teacher primarily uses the interrogative form and the request for information function. However, teachers do vary the conceptual complexity of the demands based on the language level of the child. For example, a lower level request for information used with the more severely language impaired children required the child to give a simple response to the question in which there was a match between the referents and the content of the question. More complex requests for information used with the less impaired children involved higher level discourse skills and required the child to utilize analytic thinking and metalinguistic skills in his response. The authors found that those teachers who asked higher level, more conceptually complex questions and demanded more sophisticated discourse skills which surpassed the child's cognitive abilities tended to lead the children to increased failure in dealing with this level of discourse demand. Blank et. al. maintain that "we are often so focused on the concepts and skills that we wish to maximize within the child that we often fail to notice that the essence of the teaching experience is not within the child alone - rather it is in the exchange that is taking place between the teacher and the child." (p. 4).

Silliman, Gollub, and Chizzik (1980) who looked at clinicians' input investigated Blank, et. al.'s (1978) proposal that the form and function of the language of instruction is held constant while the complexity of the content varies according to the child's language abilities. They found that the interrogative form and the request for information function were used most frequently by the clinician regardless of the child's language level. The clinicians' high use of requests resulted in their control of the conversation and the interactional exchange with the child became instructional in nature. The clinician assumed a dominant role and did not allow the child to initiate topics in the conversational interchange. Similar to Blank, et. al.'s (1978) findings, Silliman, et. al found that the clinician too varied the content complexity of the message and increased the level of discourse demand with increasing language level and comprehension abilities of the child. When the child

failed to respond or responded inappropriately to the clinician's request, the clinician would revise the message by either repeating her prior message, paraphrasing the request by altering its content, or supplying the solution and answer to the request. The authors maintain that the use of the question-answer routine can be a more effective teaching procedure if the clinician would less often supply the requested information and instead allow the children to provide the answers to the questions based on their conceptual knowledge. It is also suggested that the use of the question-answer routine as the predominant discourse strategy should be supplemented by more advanced communicative functions such as narratives, explanations, and instruction giving as the language level of the child increases.

In a study of the clinicians' input to language impaired children, Prutting, et. al (1978) found that the communicative act most frequently produced by the clinicians was requests for information while the children mainly used responses. In terms of conversational skills, the authors found that the clinician and the child were engaged in continuous discourse and were able to sustain a prior discourse topic. In contrast to Silliman, et. al.'s (1980) findings, Prutting et. al. found that the children introduced new topics more often than the clinicians.

Hubbell (1977) also reported on the style that the clinician used in interacting with the language disordered child. He maintains that verbal interaction facilitates lenguage growth and is more important than verbal stimulation in the child's language development. In an attempt to get the child to talk, the clinician often uses imitation and prompts, asks questions, or commands the child to say something. All these direst teaching methods require the child to talk and tend to inhibit the child's language growth. However, clinicians who model the correct behavior, follow the child's lead in play, comment and expand on the child's activities and utterances, and avoid using commands and questions, tend to facilitate language growth and spontaneous talking in the child.

The present study was designed to investigate a language impaired child's use of language in three different contexts: the home, the school, and the clinical situation. Our interest was in investigating the relationship of the adult input in terms of its syntactic, semantic, and pragmatic features to the verbal output and communicative style of the child. In addition to describing the kinds of features that may account for the differences in communicative style in the adults as well as the child, we hoped to explore the issue of what facilitates spontaneous talk in the language impaired child.

Method

Subject

D. is an 8.5 year old male language impaired child who has been attending intensive speech and language therapy since September 1976. At the onset of therapy, D.'s ability to interact with the environment was limited and inappropriate. His play was often ritualistic and his language included stereotypic one and two word utterances, echolalia, delayed imitation, vocal play, jargon, and limited gestures.

Past language therapy has focused on increasing D.'s reciprocal interactions, developing his representational abilities through symbolic play, expanding his use of different syntactic combinations to encode and coordinate a variety of content categories, increasing his use of a wide range of communicative functions, and developing his discourse skills as a speaker and as a listener within a communicative interaction.

Recent therapy included training D. to produce complex sentences, to respond to requests for clarifications and to develop his use of a varied intonation pattern. At present, D. coordinates a variety of content categories and uses a wide range of communicative functions. He uses language to request, label, comment, respond, and question. D.'s major area of deficit is in his use of language, primarily in the area of conversational skills. D. can engage in a communicative interaction for approximately 1-2 speaker-listener exchanges; however, he has difficulty initiating, extending, and terminating the communicative interaction. Recently D. began to engage in monologues and story telling. In general, it has been noted that the amount of spontaneous verbalization displayed by D. increases or decreases as a consequence of his environmental setting.

Apparatus

The experimental procedure was conducted in three different settings:

1. The waiting room of the Queens College Speech and Hearing Center.

2. A 10' by 15' therapy room at the Queens College Speech and Hearing Center.

3. A room at the Birch School for Exceptional Children.

These settings were representative of D.'s daily environment. The adult and the child were seated at a table and/or on the floor during the free play context. One of the experimenters videotaped and later transcribed all three recordings.

Stimulus materials consisted of a Fischer Price Safari Toy including five pretend people, six animals, two trucks, two cages, one tent, a net and a safari belt.

Procedure

D.'s communicative interactions were observed with three adult speakers - D.'s mother, teacher, and clinician. These interactions were observed in settings typical of each adult-child interaction. The mother's interaction with D. was observed in the waiting room of the Queens College Speech and Hearing Center; the clinician's interaction with D. was observed in the therapy room at the Queens College Clinic; the teacher's interaction with D. was observed in a room at the Birch School. Each interaction involved the adult and the child engaged in play with the safari toy. The adults were instructed to interact with D. as they normally would given a play situation. A total of ten minutes of interaction was analyzed for each dyad.

A variety of semantic and pragmatic analyses were used to analyze the adult and child utterances. Snow's coding system (1979) (see Appendix A) was used to measure the degree to which the adult's utterances were contingent and semantically related to the child's preceding linguistic and non-linguistic behavior. The number of self-repetitions and expanded self-repetitions employed by the adult in their interactions with the child were also measured.

Various pragmatic analyses were used to investigate the bidirectional relationship of the adult-child interactions. The communicative functions and specific communicative acts used by the three adults and the child in each setting was analyzed accoring to the taxonomy of Wollner and Geller (1981) (see Appendix B). The conversational acts employed by both the adult and the child in their interactions was analyzed according to a coding system derived from the taxonomies of Corsaro (1979) and Wollner and Geller (1981) (see Appendix C).

Results

The total number of utterances spoken by each adult and by the child in the three play contexts was tabulated. Table 1 reveals that the proportion of the clinician's utterances (.58) was less than the teacher's (.64) and the mother's (.74) whose verbalizations consumed a greater part of the interaction. This, in turn, affected the frequency of utterances produced by the child.

Table 1. Proportion and frequency of utterances for each speaker and the child's related M.L.U.

Speaker	Proportion and Frequency of utterances		Child's M.L.U.
Mother	.74	190	
Child	.26	67	2.5
Teacher	.64	134	
Child	.36	76	3.2
Clinician	.58	125	
Child	.42	91	3.8

D. produced the greatest number of utterances (91) with the clinician and fewer utterances with the teacher (76) and the mother (67). In terms of formal linguistic measures, D.'s mean length of utterance with the clinician, teacher, and mother was 3.8, 3.2 and 2.5, respectively.

In terms of adult communicative functions, Table 2 illustrates the specific communicative acts used by the three adult participants.

Table 2. Proportion of adult communicative functions and specific communicative acts.

Primary Communicative Function/Specific Communicative Act.	Mother	Teacher	Clinician
REQUEST	.50	.66	.34
action	.17	.07	.12
information	.30	.52	.18
clarification	.03	.08	.03
COMMENT	.38	.27	.52
RESPONSE	.12	.05	.15
to questions	.01	.007	.02
clarifications	.03	.007	.06
acknowledgments	.08	.04	.07
REGULATE CONVERSATION	.025	.007	
attention getter	.02	.007	
greeting	.005		

The primary communicative act used by D.'s mother were requests (.50), specifically requests for information (.30), followed by comments (.38). Responses and organizational devices were used minimally. In terms of communicative functions, the teacher's style was similar to that of the mother. The communicative act most frequently used by the teacher included requests (.66), mostly requests for information (.52), followed by comments (.27). Similarly, she rarely used language to respond and regulate the conversation. The clinician adopted a different style of interaction from that of the mother and the teacher as noted by the functions she expressed. The communicative act most frequently used by the clinician was comments (.52) followd by requests (.34) and responses (.15).

Table 3. Proportion of the child's communicative functions and specific communicative acts with the three adult speakers.

Primary Communicative Function/Specific Communicative Act	Child(mother)	Child(teacher)	Child(clinician)
REQUEST	.16	.12	.43
action	.13	.04	.40
information	.01	.08	.03
clarification	.01		
COMMENT	.41	.29	.45
RESPONSE	.43	.56	.12
to questions	.25	.47	.10
clarifications	.04	.06	.01
acknowledgments	.13	.03	.01
REGULATE CONVERSATION		.03	
attention getter		.03	
greeting			

The majority of D.'s utterances with his mother expressed the comment (.41) and response functions (.43) followed by requests (.16). The greatest proportion of utterances used by D. in his interactions with the teacher were responses (.56) followed by comments (.29) and requests (.12). In his interactions with the clinician, the majority of D.'s utterances fell into the comment (.45) and request functions (.43). Responses accounted for a small proportion of his utterances (.12). These findings point to the bidirectional nature of language use. The child produced a proportionately greater amount of responses with the teacher and the mother who primarily interacted with D. by using request for information questions. In contrast, the child produced fewer responses and a proportionately greater amount of requests and comments with the clinician whose primary interactive style consisted of commenting on the child's ongoing actions and activities.

In terms of semantic relatedness, Table 4 illustrates the proportion of adult utterances semantically contingent on the child's prior linguistic, non-linguistic and/or vocal behavior. Sixty-five percent of the mother's input, .68 of the teacher's utterances input, and .78 of the clinician's input was semantically related to the child's prior linguistic behavior, non-linguistic behavior, and/or non-verbal vocalization. Specifically, the majority of the mother's utterances (.59) were semantically related to the child's prior non-linguistic (.29) and/or linguistic behavior (.30). The majority of the teacher's (.52) and the clinician's (.55) utterances were semantically contingnet on the child's prior verbalization. Differences were noted in the type of semantically related utterances used by the adult when they were responding to the child's prior utterance. Of these semantically contingent utterances, a large proportion (.51) of the clinician's utterances were semantic extensions, whereas a large proportion of the mother's and the teacher's utterances were word elicitations (.50 and .69, respectively).

In terms of the use of self-repetition (see Table 4), twenty-four percent of the mother's utterances and .21 of the teacher's utterances were semantically related to their own prior utterance. The majority of these utterances involved expanded self-repetitions. In contrast, the clinician produced a total of .10 self-repetitions and expanded self-repetitions.

Table 4. Proportion of semantically related speech of the three adult speakers

Semantic Relationship of Adult Utterance	Mother	Teacher	Clinician
To child's non-linguistic behavior	.29	.15	.17
To child's non-verbal vocalization	.06	.8	.06
To child's utterance			
Imitation	.04	.07	.13
Expansion	.03	.05	.06
Semantic Extension	.07	.04	.28
Elicitation of words related to child's prior utterance	.15	.36	.08
To "here and now"-semantically unrelated to child's linguistic and non-linguistic behavior	.11	.12	.11
To adults own prior utterance			
Self repetition	.06	.05	.06
Expanded self repetition	.18	.16	.04

The bidirectional effects of adult-child interactions in terms of the conversational acts employed by both participants was analyzed. Table 5 illustrates the various conversational acts used by the three adult interactants.

Table 5. Proportion of conversational acts used by the three adult participants

Conversational Acts	Mother	Teacher	Clinician
INITIATE INTERACTION/CONVERSATION	.36	.26	.16
EXTEND INTERACTION/CONVERSATION	.65	.73	.83
Topic Relevant Acts (TRA)	.36	.36	.35
Topic Relevant Responses (TRR)	.11	.11	.30
Off Topic	.01	.02	.05
Resume Topic	.06	.06	.08
Clarification Request	.11	.18	.05

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The primary interactional style of all three adults consisted of extending the conversational interaction. However, both the mother and the teacher tended to initiate topics more frequently (.36 and .26) than the clinician (.16). In terms of extending the communicative interaction, mother, teacher, and clinician used primarily topic-relevant acts. In terms of other types of conversational acts, the clinician used more topic-relevant responses than the other two adults. Both the mother and the teacher extended the conversation with clarification requests more frequently (.11 and .18 respectively) than the clinician (.05).

The proportion of conversational acts employed by the child with each adult participant is illustrated in Table 6.

Table 6. Proportion of conversational acts employed by the child with the three adult interactants

Conversational Acts	Child(Mother)	Child(Teacher)	Child(Clinician)
INITIATE INTERACTION	.12	.13	.27
EXTEND INTERACTION	.88	.87	.73
Topic Relevant Act (TRA)	.27	.17	.42
Topic Relevant Response (TRR)	.50	.52	.18
Off Topic	.01	.04	.03
Resume Topic	.03	.02	.03
Clarification Request	.02	.03	.03
Clarification Response	.05	.09	.04

D. initiated the topic of conversation a proportionately greater amount of time with the clinician (.27) than with the mother (.12) and the teacher (.13). The child extended the interaction with all three adults; however, the specific conversational functions used were different. With the mother and the teacher, the child primarily extended the interaction by producing topic-relevant responses (.50 and .52, respectively), whereas with the clinician, D. primarily extended the interaction by producing topic-relevant acts (.42).

Discussion

The present study examined the effects of adult input in terms of selected syntactic, semantic, and pragmatic features on the verbal output and communicative style of a language disordered child. The literature on adult-child interactions with normal and language disordered children suggests that there are two interactive styles most frequently employed by adults. These are referred to as the directive and non-directive styles. In general, those adults who are directive assume a more tutorial role in their interactions which tends to inhibit the child's linguistic output. In contrast, those adults who are non-directive act more as conversational partners which tends to facilitate the child's verbal output (Hubbel, 1977). In the present study, the mother and the teacher used a directive style in their interactions with D., whereas the clinician used a non-directive, interactional style. These style differences were characterized by the linguistic devices used, the functions of language expressed, and the conversational acts employed in interactions with the child.

Researchers have found that speech addressed to language impaired children contains a greater amount of verbal output (Cramblit and Siegal, 1976; Stein, 1976). Snow (1977) has found that with normal children the mean length of the adult turn decreases as the child becomes a more active participant in the interaction. The interactive effect of this aspect of the communicative exchange, i.e., the amount of talk that each participant engages in, was noted in our study. Both the mother and the teacher dominated the communicative exchange which seemed to limit the child's verbal output in terms of M.L.U. The clinician assumed a less controlling role in her interactions with D. by encouraging him to initiate play and by commenting on ongoing actions and activities. Here the child's verbal output was characterized by an increased M.L.U.

The importance of exposing children who are learning language to semantically contingent speech has been emphasized in recent years. In terms of semantic relatedness, our findings indicate that the majority of utterances used by the three adults were semantically contingent on the child's prior linguistic and/or non-linguistic behavior. In other words, the semantic content of the adult input was determined by the child's actions and/or talk. These results support the findings in the literature of adult input to normal children learning language. It has been found that the adult input to normal children consists of repetitions and expansions which are semantically related to the child's preceding utterance and activities in the "here and now" (Cross, 1978; Snow, 1972, 1977, 1979; Newport et. al., 1977). Although all of the adults used speech which was semantically contingent on the child's prior linguistic utterance, different linguistic strategies were employed. The mother and the teacher used more elicitation of words relating to the child's previous utterance whereas the clinician used more semantic extensions. These results contributed to the impression of differences in interactive styles. The mother and the teacher were directive and tutorial in that both appeared to be concerned with teaching the child linguistic forms and focusing the child's attention. On the other hand, the clinician's greater use of semantic extensions led to the impression of a more "cooperative" conversational partner.

In terms of our analysis of communicative functions, we found a direct correspondence between the communicative acts expressed by the adult and those expressed by the child. The mother and the teacher used mainly requests, specifically request for information questions, designed to obtain information from the child. As a result, the primary communicative function used by D. with the teacher and the mother was responses. Using a less directive style, the clinician primarily commented on the child's actions and activities which seemed to give D. more opportunities to expand the topic of conversation. As a result, with the clinician, D. used many comments and requests and few responses.

The mother's extensive use of the request function is consistent with the findings in the literature. Mothers of normal and disordered

children observed in naturalistic contexts have been found to employ a directive style of interaction with their children including many requests and few comments on ongoing activities (Corsaro, 1979; Giattino and Paterson, 1980; Grossfeld and Geller, 1980; Newport et.al., 1977; Snow, 1979; Stein, 1976). Similarly, research on teacher-child interactions has shown that the primary communicative function used by the teacher is the request for information question (Blank et. al. 1976; Silliman and Leslie, 1980). It should be noted that studies of teacher-child interactions have been conducted in structured contexts. In our study, all adult-child interactions were observed in a naturalistic, free play context. It is interesting therefore, to note that the communicative functions used by the teacher in this study were the same as those reported in previous studies done in structured situations. It seems that the teacher may use the request function in both structured and non-structured contexts in order to control the social interaction.

The literature on clinician-child exchanges also points to a directive style of interaction. These studies have focused on interactions between the clinician and the child in a structured context. In these contexts, the communicative function used most often by the clinician was request for information questions which resulted in the child's use of responsive communicative acts. In our study, the clinician and D. interacted in a naturalistic, free play context, where the clinician used many more comments and few requests. This may indicate that when the clinician engages in free play interactions with the child and is less focused on a training goal, she is in some ways a better language facilitator.

In terms of conversational patterns, the degree and manner in which adult participants and the child initiated and extend the conversational interaction was investigated. The mother and the teacher controlled the interaction by initiating most of the discourse topics. They both extended the topic of conversation by producing topic relevant acts (TRA) which often took the form of questions used to request information or action from the child. In response to the mother and the teacher, the child sustained the discourse topic by producing topic relevant responses (TRR). The mother and the teacher's directive style of interaction seemed to limit D.'s opportunities to be a more active participant in the conversation. These results are consistent with the findings of Corsaro (1979) who maintained that this TRA-TRR pattern is typical of adult-child discourse where the adults use certain conversational acts in order to assume full control over the social interaction.

Cross (1978) describes good language teachers as those mothers who follow the child's lead in the conversational interchange, allow the child to determine the topic of conversation, and then expand and add to it. This style of interaction was more typical of the clinician in the present study. The clinician followed the child's lead in the conversational interaction, allowed the child to initiate the topic of conversation, and extended the communicative interaction without requiring a response from the child. In response, D. initiated the

topics more frequently with the clinician and extended the interaction by producing conversational acts which added new information. The non-directive style of interaction employed by the clinician allowed D. to be a more active and dynamic participant in the social interaction.

In summary, the study has demonstrated that adult input in terms of semantic and pragmatic features affects the verbal output and communicative style of the child. The results indicated that a non-directive, cooperative style of interaction may facilitate the use of language relative to certain syntactic, semantic, and pragmatic dimensions. These results support Hubbell's (1977) notion that those clinicians who follow the child's lead in play, comment and expand on the child's activities and utterances, and avoid using commands and questions facilitate language growth and spontaneous talk in the child.

Continued research is needed in order to determine what constitutes the best language learning environment for a language disordered child.

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Appendix A from Snow (1979)

Coding System for Judging Semantically Related and Contingent Maternal Utterances

Maternal utterance related to the child's nonlinguistic behavior:

a. Object of looking

b. Object of pointing

c. Interpretation of action

Maternal utterance related to the child's nonspeech vocalization:

a. Imitation of previous vocalization

b. Interpretation based on contextual clues

c. Interpretation based on sound, e.g. whiny tone

d. Elicitation of increased vocalizations, e.g. mother, "tell me more"

Maternal utterance related to the child's utterance:

a. Partial or complete imitation

b. Expansion by filling in function words and grammatical marker, but not adding new information

c. Semantic extension by filling in function words and grammatical markers and adding new information

d. Elicitation related to previous utterance

Maternal utterance not related to the child's activity, vocalization, or utterance. Scored for semantic relatedness (see above) and the following repetitions:

a. Partial or exact

b. Expanded, e.g. "That's a clock." "That's a clock like in your book."

Appendix A from Snow (1979)

Coding System for Semantically related utterances

1. Maternal utterance related to the child's non-linguistic behavior.
   a. to what he is looking at. Example: child turns to look at observer, mother says, "that's Clara."
   b. to what he is pointing to: Example: child points to picture in book, mother says, "Dingo just had another accident."
   c. to an action he is carrying out. Example: child knocks tower over, mother says, "You knocked it over."

2. Maternal utterance related to the child's nonverbal vocalization.
   a. Imitation of the child's previous vocalization. Example: Child says, "bababa," mother says, "Bababa yourself."
   b. Interpretation of the child's vocalization using cues from the situation. Example: Child says, "aah" while knocking tower over, mother says, "Faaal down."
   c. Interpretation of the child's vocalization using only its sound as a cue. Example: Child says "aah" with a whiny tone, mother says, "Don't you feel good?"
   d. Elicitation of more vocalizations on the basis of previous ones. Example: Child babbles, mother says, "Come on, tell us the rest of the story."

3. Maternal utterance related to the child's utterance.
   a. Imitation, partial or complete, of preceding child utterance. Example: Child says, "baby", mother says, "Baby, yes, that's a baby."
   b. Expansion of the child's utterance, adding no new information to it but filling in omitted function words and grammatical markers. Example: Child says "clock", mother says, "That's the clock, yes."
   c. Semantic expension of the child's utterance, in which both new information and grammatical markers and function words are added. Example: Child says, "that", mother says, "That's no good, eh?"
   d. Elicitation of words related to child's previous utterance. Example: Child says "duck", mother says, "Yes, what's his name? What do you call him? Is that Donald? Say Donald!"

4. Maternal utterance not related to child's activity, vocalization, or utterance.

In addition to being scored on semantic relatedness, the maternal utterances were scored as self-repetitions using the following categorization.

1. Self-repetition (exact or partial) e.g., "That's the clock. That's the clock." or "That is the clock. The clock."

2. Expanded self-repetition, e.g., "That's a clock. That's a clock, like in your book."

Appendix B
Definition of Communicative Functions

The communicative functions used in this study were derived from the taxonomy presented by Wollner and Geller (1981) and adapted from Dore, Gearhart and Newman (1978).

1. Requests
   a. requests for action - solicit actions from the hearer; e.g., "gimme," "more ride," "close the light."
   b. request for information - solicit information from the listener; e.g., "What do you watch on t.v.?"
   c. request for clarification - seek clarification of hearer's prior utterance; e.g., "What do you mean?"

2. Comments - This involves the identification or description of objects, events, people, and locations; e.g., "That's a flower," "I'm building a tower."

3. Responses
   a. to questions - the speaker gives solicited information to another speaker's prior question; e.g., "Where does that go?" - child's response: "In the truck."
   b. clarification - provide clarification of speaker's prior utterance; Child: "ga"; Adult: "What did you say her name is?" Child: "Gloria."
   c. Acknowledgment - speaker acknowledges a prior utterance; e.g., "Yeah," "Oh."

4. Regulate Conversation - devices used to control the conversational flow.
   a. attention getter - solicit attention; e.g., "Hey," "Look," "John."
   b. greeting - attend to person by providing a greeting; e.g., "Hi, John."

Appendix C

Definition of Conversational Acts

The conversational acts used in the present study were derived from the taxonomies of Corsaro (1979) and Wollner and Geller (1981).

1. Initiate Interaction - any act that encourages a focused interaction at a time when such interaction is not in progress.
2. Topic Relevant Act - any act that is related to the previous speaker's act and goes beyond it in terms of content, e.g., Child: "Look at Big Bird." Adult: "Big Bird has feathers." (TRA)
3. Topic Relevant Response (TRR) - any act which is a response to a particular topic-relevant act of another or a marker of acknowledgment of a topic relevant response of another. Topic relevant responses are totally responsive and do not go beyond the TRA and TRR which preceded them in terms of content. e.g., Adult: "What's her name?" - Child: "Susan."
4. Off Topic - any act within an interact which is not relevant to the topic and is initiated without a formal topic shift marker. e.g., Ongoing Topic - Sesame Street; Child,"I got new sneakers."
5. Resume Topic - any act referring back to a previously introduced topic, e.g., Discourse Topic - Sesame Street; Child: "sneaker," Adult: "Where's the Sesame Street house?"
6. Clarification Request - any act which calls for the clarification, confirmation, or repetition of a preceding act. This usually takes the form of an interrogative. e.g., "What did you say?"
7. Clarification Response - any act which is a direct reaction to a clarification request. It does not go beyond the information or behavior requested in the preceding clarification request. e.g., clarification request - "What did you say?" - clarification response - "I'm hungry."

I'm an Aunt; you're an Ant: an investigation of the ability to train lexical ambiguity awareness in a Down's Syndrome child.

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Abstract

The purpose of this study was to determine the feasibility of training metalinguistic skills in the clinical setting. Through a series of systematic probes and training tasks, it was demonstrated that a ten-year old Down's Syndrome child could make judgments of grammaticality; learn to formulate definitions of non-ambiguous words; and learn to recognize and define a lexically ambiguous item whether the word was presented alone, in a sentence, or within a riddle. Implications for future research and clinical intervention are discussed.

The nature of human language is so complex that its acquisition normally takes as much as twelve to fifteen years to develop fully and reach the adult level of competence. Children must first learn conceptually about their environment before they learn the linguistic forms of sounds, words and phrases that encode the content or meaning of the messages to be communicated. They must also learn how to use these linguistic skills to perform a variety of functions in a socially conventional way. Thus, children learn the preliminary constituents of language, the phonological, syntactic, semantic and pragmatic rule system in the first three or four years of life. They are also developing cognitively. Further cognitive and linguistic development is in the nature of refining these basic skills thus far acquired, and this permits the child to talk about language as an object.

The ability to deliberately and intentionally think about and reflect upon language is described in the literature as a metalinguistic skill. Although this skill is usually evident in older children and adults, children as young as two- to three- years of age have been known to demonstrate linguistic awareness (Hakes, in press). The child who corrects her mother's statement, "You're a good cook", saying, "You mean, 'I'm a good cooker'" is demonstrating an early metalinguistic awareness (Horgan, 1980) . Metalinguistic performances can be of several types: explicitly deciding whether or not an utterance is acceptable, i.e., grammatically correct, or ambiguous or whether or not two utterances are synonymous.

The metalinguistic performance most discussed in the literature is the ability to detect and understand linguistic ambiguity. Ambiguity occurs whenever a sentence or word possesses two or more distinct semantic interpretations. Although an ambiguity exerts some influence on comprehension processing, listeners rarely notice ambiguity in their spontaneous conversation because the linguistic and non-linguistic contexts in which such utterances normally occur frequently serve to

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disambiguate them. However, when the disambiguating context becomes available after the comprehension processing of the ambiguous item, an interpretation that is inconsistent with the context may occur. The result is a breakdown of the communicative process (Hakes, in press). This is what appears to occur with "garden-path" sentences like, "The fat grocer weighed 200 cantaloupes". The ambiguity arises when normal comprehension processing fails to yield its expected result of a coherent meaning.

Shultz and Pilon (1973) identified a number of different levels of linguistic ambiguity. Phonological and lexical ambiguity occur when a given phonological sequence or lexical item has more than one semantic interpretation, e.g., "club" can refer to either a large stick or a social organization. Confusion about the boundaries between words results in ambiguous strings such as "eighty cups" versus "eight tea cups", while the condition of homophony derives from two or more historically distinct words possessing similar pronunciations, e.g., "pear" versus "pair". There are two sources of syntactic or structural ambiguity, one based on surface-structure relations and the other on deep-structure relations. Surface-structure ambiguity, also referred to as grouping ambiguity, results when the words of a sentence can be grouped in two different ways, with each expressing a different semantic interpretation. Deep-structure ambiguity, on the other hand, derives from two different deep structures being mapped onto a single surface structure.

The developmental progression of the various types of linguistic ambiguity detection in children 6, 9, 12, and 15 years of age was studied by Shultz and Pilon (1973). Their findings suggested that this ability develops at different rates, depending on the type of ambiguity. In particular, the ability to detect phonological-lexical ambiguity appears first at approximately six to nine years of age, while detection of both types of structural ambiguities does not appear until age twelve and is only partially developed by age fifteen. In addition, the authors demonstrated that a non-linguistic context such as pictures clearly served to facilitate all three types of ambiguity detection. Keil (1980) also found that for both linguistic and non-linguistic modes (pictures), correct performance of five- to fourteen-year olds on tasks involving lexical ambiguities was better, and was observed earlier, than on tasks involving structural ambiguities. Again, significant differences by age were found in the six- to eight-year olds' perception of lexical ambiguities. For structurally ambiguous sentences, there was a significant difference in the eight- to twelve-year-old age group. Apparently, structurally ambiguous stimuli require additional abilities to be processed. Keil (1980) also presented evidence suggesting that perception of ambiguous sentences involves different psychological processes than perception of ambiguous pictures. This should be kept in mind when considering the above findings.

Our interest in ambiguity lies in the fact that several linguistic structures are predicated on this particular aspect of language. One such ambiguous structure is the idiom, which usually has two distinct semantic interpretations, the literal and the idiomatic (Lodge and Leach, 1975; Schwartz, Garner, Sheffler, Van Vooren, 1982). Lodge and Leach (1975) found that the literal meaning of idioms is acquired first, followed by idiomatic meaning acquisition, which does not begin until after age nine. The authors suggest this developmental trend may signal the beginnings of a semantic duality process, which is characteristic of adult language and therefore may be regarded as a milestone in a child's acquisition of adult language.

The proverb, like the idiom, is also an ambiguous structure in that it has both a literal and abstract meaning. Schwartz, et al. found that two-thirds of the eleven-year olds achieved 75 per cent accuracy in comprehension of proverbs while all of the thirteen-year olds responded at adult performance levels. Clearly, these behaviours reflect the acquisition of the ability to deal with abstract semantic components of language.

The ability to understand some forms of humor also depends on an ability to detect and comprehend ambiguous structures. Most types of humor can be explained by the incongruity and resolution theory in which the appreciation of humor is determined by one's ability to notice and resolve the incongruity (Shultz and Horibe, 1974). Although many jokes depend on general non-linguistic knowledge about the world, the more sophisticated riddles turn to linguistic ambiguity for a successful resolution. There has recently been an increasing interest in the literature in the comprehension and appreciation of jokes and riddles based on lexical ambiguity. Shultz and Horibe (1974) presented original, resolution-removed and incongruity-removed forms of linguistic jokes to children of various ages.

Results from both comprehension and appreciation measures suggested that the transition between a stage of pure incongruity, i.e., a preference for absurdity, and a stage of resolvable incongruity in humor occurs between the ages of six and eight years. The timing of this transitional period suggests that it is related to the onset of concrete operational thought, which is characterized by the systematic organization of cognitive schemes.

The research thus far discussed concerning various metalinguistic performances and especially those involving ambiguous structures such as proverb, idiom and humor comprehension have suggested that these abilities are all mediated by some general cognitive processing abilities. The issue of cognitive development in relation to language learning has become a dominant issue in both theory and research (Frommer, 1975).

Piaget's pre-operational stage (ages three to seven) and concrete-operational stage (ages seven to eleven) are particularly relevant to the above skills. The thought of the pre-operational child is intuitive and focuses on states rather than processes. The child cannot relate an original state to an altered state, which Piaget calls irreversibility of thought. He/She cannot conserve. The concrete-operational child, on the other hand, can decenter attentionfrom the present state of a display and imagine the display if it were altered. The critical ages for comprehension of lexically ambiguous stimuli are between six and eight years. This suggests that this skill corresponds to the child's attainment of the concrete-operational level of cognitive development.

McGhee (1971a, 1971b, 1974) investigated the relationship between children's level of cognitive functioning according to Piaget's theoretical framework and their comprehension and appreciation of various humor stimuli. The first study utilized two types of cognitive humor: Incongruity humor, in which expectancy violations occur only at an abstract level; and Novelty humor, which occurs when violations are of visual expectancies, i.e., physical discrepancies from the child's prior experience. McGhee asserted that if the use of logic is important for the comprehension of incongruity in humor, then pre-operational children should show poorer comprehension of incongruity jokes than concrete-operational children. However, pre-operational and concrete-operational children should not differ in their comprehension of novelty humor. His results confirmed this hypothesis. The only signigicant relationships between cognitive scores and humor comprehension was with the seven-year olds with incongruity classes of humor. Operational thinking was found to be necessary for the comprehension of incongruity humor, but not for novelty humor. The children's spontaneous "mirth responses" (i.e., smiling; laughing) and subjective ratings on a five-point "funniness" scale revealed that an appreciation of humor does not appear to be contingent upon level of cognitive development. This appears to imply that children laugh at jokes they don't understand. While this may be the case, it is not necessarily true. It may be that cognitive humor is experienced as being funny in the sense of being clever. Thus, the child experiences a cognitive appreciation of cognitive humor, but does not rate the joke "funny". Conversely, a child's humor response might stem from any of several aspects of the stimulus situation. Even though a child may not perceive the logical inconsistency in an incongruity joke, he/she may find it funny strictly in terms of some perceptual aspect of the stimulus. The fact that the children knew that the stimuli presented were jokes may have contributed to this type of responding.

In a subsequent paper, McGhee (1974) investigated developmental changes in children's ability to: 1. discriminate joking from factual answers to word-play riddles based on linguistic ambiguity and absurdity riddles, 2. create their own joking answers and 3. offer a verbal statement regarding the necessary prerequisites for humor. Analysis of the data revealed that although first-graders were unable to discriminate joking from non-joking answers, discrimination progressively improved with

increasing age, as did the ability to create joking answers of their own. Of significance, the ability to formulate a verbal explanation regarding the nature of wordplay riddles was not found to be a necessary condition for generating joking relationships, and furthermore, did not develop before twelve years of age. The fact that at each grade level some children did very well at creating their own humor while others were completely unable to do so, suggested that individual differences in interest in joking and past experience with humor may have been an important factor in determining the data obtained. Although it is more difficult to create a joking relationship than to identify an already created one, both of these abilities appear to be acquired during Piaget's concrete-operational period.

The study of linguistic awareness in general and ambiguity in particular is important for a variety of reasons. Psycholinguists who study the interpretation of linguistic ambiguities and the comprehension processing strategies used to resolve them are not studying "special cases" of language comprehension. Rather, they are using linguistic ambiguity to understand the psychological processes operating to interpret language. Furthermore, linguistic ambiguities are prevalent in our language. Some communicative failures are due to a lack of ambiguity recognition on the part of one of the participants during discourse. When communication breaks down, it is often the ability to detect and resolve the ambiguity that restores the communicative failure.

The ability to detect and resolve ambiguity is important in the development of complete linguistic competence. Furthermore, linguistic awareness plays an important role in the child's acquisition of certain academic skills, such as reading, writing, spelling and the learning of traditional prescriptive grammar. The educator's concept of "reading readiness" takes into account the child's ability to segment and to separate words from their referents. All of these tasks require metalinguistic performances. Finally, linguistic awareness is important for its role in the development of abstract language and as a linguistic device in the enrichment of our language.

Most studies of linguistic awareness have involved the performance of normal children with average intellectual functioning, who have experienced no signigicant difficulties in their language acquisition or social interactions. But what about the child exhibiting deficits in these areas? How might the mildly retarded child deal with linguistically ambiguous structures in everyday interactions?

Mental retardation generally refers to subaverage intellectual functioning relative to chronological age, existing concurrently with deficits in adaptive behavior (Bloom and Lahey, 1978). These children are frequently observed to be perseverative in their behavior, that is, they are incapable of switching easily from one task to another. These behaviors translate directly into language skills, with retarded adaptive behaviors highlighting the interpersonal language functions.

Because these children are cognitively retarded (pre-operational), their language is egocentric in nature, that is, they demonstrate an inability to take the role of others and therefore make little effort to adapt their speech to their listeners (Schiefelbusch, Copeland and Smith, 1967). Quantitative analyses of the speech of retarded children have described impoverished vocabulary, shorter and less complex sentence structure, less abstract language and later developemtn of the use of verbal mediation. In general, an overall relationship has been found between language and I.Q. (Bloom and Lahey, 1978). Although quantitative studies point to differences between the language of the normal child and the retarded child, qualitative analyses point to similarities between these two populations. In a review of the research on the language of children with Down's Syndrome, Evans and Hampson (1968) concluded that there is no consistent relationship between Down's Syndrome and a unique language pathology. Their language development is apparently similar to that of normal children at a younger age, i.e., they may be delayed in the language acquisition process, but certainly not deviant. Clearly, mental retardation and linguistic retardation are correlates. This suggests that therapeutic attention be focused on teaching the concepts that language codes and on inductive techniques that lead to the acquisition of rules and strategies.

Recent evidence suggests that linguistic awareness plays a "facilitative role...in learning to communicate (Levelt, Sinclair and Jarvella, 1978). Therefore, the implication for the language-disordered child who fails to develop this awareness is limited communicative and academic success. Since many metalinguistic skills are developed during the middle childhood years, the probability of this failure is high for the Down's Syndrome child who progresses slowly through the stages of language acquisition and does not attain the skills upon which abstract language is predicated. Thus the necessity for developing clinical intervention procedures for training these skills is apparent. It is unlikely that training general language skills will automatically give rise to the emergence of metalinguistic skills, due to the concrete-operational level of cognition that is required. It was demonstrated that teaching pre-operational children the language of concrete-operational children did not enable them to succeed in conservation tasks (Sinclair-de-Zwart, 1969). Although there is evidence that direct training of metalinguistic skills can be accomplished with normal children, (e.g., Liberman, Shankweiler, Liberman, Fowler and Fischer, 1977), it is necessary to determine if metalinguistic skills can also be trained within the language-disordered population.

The purpose of this study was to determine the feasibility of training metalinguistic skills within the clinical setting. In particular, we asked can an awareness of lexical ambiguity in single words and in sentences be trained? Several questions were investigated:

1. Can the specific metalinguistic deficits, assuming some exist, be trained? Will the specific lexical ambiguity training program used in this study prove to be of therapeutic value with a Down's Syndrome population?

2. Will the child demonstrate any post-training generalization from specifically trained items to new, untrained items?

3. Will the acquisition of one type of metalinguistic skill, (e.g., recognizing lexical ambiguity), automatically and spontaneoudly elicit the acquisition of another type of metalinguistic ability, (e.g., the comprehension of lexical riddles?).

Method

Subject:

The subject was a 9;11 year old Down's Syndrome female, enrolled in her sixth semester of speech and language therapy at the Queens College Speech and Hearing Center. The subject was delayed in all developmental milestones. She walked at twenty months, spoke single words at three years and combined words at four years. The subject had been enrolled in appropriate infant and preschool programs. At the time of this study she was attending a fourth grade HC-30 (Health Conservation) class.

The subject's level of intellectual functioning was considered to be in the dull-normal to mildly retarded range. Throughout the course of her sessions at Queens College, the subject appeared to function conceptually at a relatively concrete level. She neither produced nor comprehended abstract language, nor did she demonstrate inferential thinking capabilities. The Conservation subtest of the Concept Assessment Kit (Goldschmid and Bentler, 1968) was administered in November of 1981. Results were indeterminate; although, the subject demonstrated the ability to conserve on some of the tasks.

Analysis of three language samples, collected in March 1981, revealed that the subject encoded most content categories. Additionally, it was observed that she expressed most communicative functions. Furthermore, the subject demonstrated mature lexical usage. The subject produced simple as well as complex sentence structures. However, she exhibited syntactic errors, such as a lack of verb-number agreement and omitted morphological endings. The subject's conversational language was frequently fragmented, disorganized, and associative. Her inability to maintain a topic resulted in confusing discourse exchanges. The subject was behaviorally rigid and perseverative, and her affect was flat.

The subject demonstrated limited metalinguistic skills. In addition to those considered prerequisite for reading and spelling, she produced self-generated rhymes and repaired her speech during communicative failures.

Apparatus:

All experimental sessions were conducted at the Queens College Speech and Hearing Center. The experimenter and the subject sat facing

each other at a small table. A second clinician sat adjacent to the experimenter and recorded the subject's responses. Most sessions were audio-recorded with a portable cassette tap recorder (Panasonic RQ 2108).

During the pre-training assessment procedure various objects such as dolls, blocks, crayons, balloons and beads were manipulated while several sentences were presented orally. Pictures of objects and actions were also employed. (See appendices A-1 and A-2 for a complete list of materials.)

Baseline materials consisted of thirty-three riddles which included four riddle types: six phonologically ambiguous riddles, thirteen lexically ambiguous riddles, eight structurally ambiguous riddles, six non-ambiguous riddles (fillers); twenty-one lexically ambiguous sentences, thirteen of which were derived from the lexically ambiguous riddles; and seventeen ambiguous words which were drawn from the sentences. (Refer to appendix B.)

Material for the lexical ambiguity training procedure consisted of picture pairs depicting both meanings of each ambiguous word and a series of probe questions. Seven ambiguous words drawn from the baseline materials were selected, based on their ease of depictability, as the training stimuli. (Refer to appendix C.)

Procedure:

A pre-training assessment procedure was instituted to ascertain if the subject had the appropriate prerequisites necessary for later-developing metalinguitic skills. This involved assessing the subject's ability to ultimately make grammaticality judgments. The task was divided into four levels.

Level A: Objects and yes/no questions were presented. The subject was required to judge whether the period element matched the object.

Level B: Actions were demonstrated while declarative sentences were presented orally. The subject was required to judge whether the sentences matched the context.

Level C: Pictures of actions were presented while declarative sentences were presented orally. The subject was required to judge whether the sentences matched the pictorial stimuli.

Level D: Declarative sentences were presented without a supporting context. The subject was required to judge whether the sentences were grammatical. These sentences were divided into semantic, syntactic, and pragmatic types. (See appendix A-1 for the complete pre-training assessment program.)

A preliminary task trained the subject to linguistically formulate a definition. Step 1 involved pairing two pictures of similar (same category) items, while asking the subject, (a) "How are these the same?"; (b) "How are these different?"; and (c) to define the items. Step 2 required the subject to supply the definition of paired pictures of objects, while Step 3 called for the definition of items represented in single pictures. (See appendix A-2.)

Three baselines were taken to assess the subject's pre-training ability to detect lexical ambiguity.

Baseline 1: Twenty-seven riddles of various types were presented verbally to the subject in a random order. The subject was asked (a) "Is the riddle funny?" and (b) "Why is it funny?"

Baseline 2: Twenty lexically ambiguous sentences were presented verbally to the subject in a random order. The subject was asked if any word in the sentence had more than one meaning. If the subject responded affirmatively, she was asked which one, and what were the two meanings.

Baseline 3: Seventeen ambiguous words were presented to the subject in the same order as the sentences from which they were drawn. The subject was asked, "What does word mean?" If only one meaning was given, the subject was further prompted, "Can it mean anything else?"; "What?" It was assumed that if the subject provided two different meanings for the word, the first response was her expected meaning, and the second response was her unexpected meaning. (See appendix B.)

The training program for lexical ambiguity was first run with a "pilot" word so that the specifics of the procedure could be modified to provide the subject with optimum training effectiveness. The procedure consisted of ten steps. All of the ten steps were instituted with one word before a new word was trained. The program was then repeated with the new word. The procedure involved displaying a pair of pictures which depicted the two meanings of each stimulus word with verbally presented sentences that explained the meanings of the word. Thus, pictures of drinking glasses and eye glasses were paired with a disambiguating sentence, conveying the subject's unexpected meaning, e.g., "The girl wore glasses to help her see better". The subject was required to point to the picture that the sentence referred to, and to give a sentence that showed the meaning of the other picture, such as, "We drink juice from glasses". Subsequent steps involved requiring the subject to produce similar sentences, alternating between the two meanings and eventually eliminating the visual cues provided by the pictures. The stimulus changed from, "Tell me a sentence that shows the meaning of the picture" to "That shows the meaning of the word". In Step nine, the experimenter verbally presented an ambiguous sentence, e.g., "The glasses are on the table". The subject was required to identity the ambiguous item and add information so as to disambiguate the sentence, e.g., "The glasses are on the table so I can't see the T.V.". Step ten proved the next word to be trained. (See appendix C for the complete details of the training program.)

The three post-training assessments were identical to the pre-training baselines but were taken in reverse order. Therefore, assessment 1 probed the subject's ability to detect the ambiguity or duality of meaning of seventeen ambiguous words. Seven of the words had been trained, while ten were untrained words. The second assessment evaluated the subject's ability to detect lexical ambiguity on the sentence level. Assessment 3 determined if the subject detected ambiguity within eleven lexical-type riddles, eight of which were included in the pre-training baseline. Five of those riddles contained one each of the trained words. The remaining three lexical riddles were novel. Nineteen non-lexical type riddles were assessed as well. Of these, sixteen were included in the pre-training baseline, while three were novel.

For all the above procedures, the subject's responses were audio recorded and judged by two clinicians.

For all the pre- and post-training procedures, reinforcement was contingent on attending to the task. For training procedures, the subject was reinforced for correct responses, in addition to attending behaviors. Reinforcement consisted of verbal praise and token exchange.

Results

The results of the pre-training metalinguistic assessment indicated that the subject was capable of making grammaticality judgments. On all four levels, she scored between 90% and 100%. When the context-absent declarative sentences were broken down into semantic, syntactic and pragmatic anomalies, the subject demonstrated an ability to judge sentences as anomalous when semantic and pragmatic violations had occurred (100%). However, when syntactic violations were the source of the anomaly, the subject's ability dropped to 62.5%.

Although initially, the subject was unable to linguistically formulate an acceptable definition, she was able to complete the training task. However, she exhibited difficulty in spontaneously expressing superordinate terms. When asked for a definition, the subject characteristically produced a phrase or sentence containing the stimulus word that described the item's function.

The data showed that a metalinguistic skill had been successfully trained and stabilized in the clinical environment. The subject's recognition of lexical ambiguities doubled from the pre-training to the post-training condition. In the pre-training baseline, she reported that three of the seven ambiguous words (43%) had at least two distinct meanings. The subject adequately communicated to the experimenter, verbally and/or through gesturing, the two different meanings for these words. This increased to six of the seven words (86%) in the post-training assessment. Conversely, the number of words for which only one and no meaning were reported substantially decreased from the pre-training to the post-training conditions. The subject communicated one meaning each for three of the seven words (43%) and no meaning for one of the words (14%) in the pre-training condition. This decreased in the post-training condition to one definition reported for only one word (14%). The subject always reported one definition on the post-training words.

The subject's identification of the ambiguous element in the sentences increased from 50% (10 out of 20) in the pre-training baseline to approximately 94% (16 out of 17) in the post-training assessment. The subject was not given credit for identification of the ambiguous item in one sentence because she named two words in addition to the correct one. The subject reported two meanings each for 20% of the words (4 out of 20) pre-experimentally and two meanings each for approximately 59% (10 out of 17) of the post-training words. The percentage of words for which the subject offered only one meaning more than doubled from the pre-training to the post-training condition, that is, she communicated one meaning for 15% (3 out of 20) of the pre-training words and 35% (6 out of 17) of the post-training words. In the pre-training baseline, the subject did not convey any meaning for three of the sentences (15%), while in the post-training condition, this dropped to zero meaning for only one word (6%).

When considering the seven sentences containing the training stimuli, the subject's performance doubled from pre-training to post-training conditions. The subject reported two distinct meanings for three of the seven words (43%) pre-experimentally and six of the seven (86%) post-experimental words. No meaning was conveyed for the seventh trained word in the post-training condition. One definition of the word was offered for one of the sentences containing a trained ambiguous word and no meaning was reported for four of these sentences in the pre-training condition. (See Table 1.)

Table 1. Results of Pre-training and Post-training Tests of Ambiguity Judgements.

No.of Meanings Reported	Pre-Training			Post-Training		
	Words	Sentences*	Riddles*	Words	Sentences*	Riddles*
0**	1	10 (3)	7 (3)	0	1 (1)	3 (1)
1	3	3 (1)	1 (1)	1	6 (0)	4 (2)
2	3	4 (3)	0 (0)	6	10 (6)	1 (1)
Total	7	17 (7)	8 (4)	7	17 (7)	8 (4)

* Includes trained and untrained items. Results for trained items are indicated parenthetically.

** Includes those trials for which the ambiguous element was not identified correctly.

A few of the words had three or more distinct meanings. It is interesting that the subject reported two of the three meanings in response to the single word stimulus and the third meaning when the stimulus was a sentence. For example, during the post-training assessment of words, the subject reported "beat" to mean a beat in music and to fight. During the post-training assessment of sentences, "beat" was reported to mean whip or scramble.

Some additonal semantic changes were observed from pre-training to post-training conditions. "Hold up" meant a robbery in the pre-training baseline of words and to support/elevate in the post-training assessment of words. "Fly" was defined as both the verb to fly and the insect in the pre-training word baseline and as the verb to fly and the noun, zipper, (zip your fly/pants) in the post-training condition.

A follow-up assessment waa administered to see if the subject had retained her newly acquired skills. A month and a half after the post-training assessments were taken, twenty-seven ambiguous and ten non-ambiguous words were randomly presented to the subject in the same manner as the previous assessments (See appendix B). The subject offered at least two distinct definitions for 100% of the seven previously trained ambiguous words and 50% of ten untrained, but previously assessed ambiguous words. For the remaining 50% of these words, the subject offered one definition. For the ten new ambiguous words, the subject produced two semantically distinct definitions for 60% and one definition for 40% of the words. The subject firmly asserted that all of the ten non-ambiguous words had only one meaning. The subject offered three separate meanings for two of the ambiguous words: For the trained word "fly", the subject reported the meanings, zipper, insect, and the verb to fly. However, only the first two of these meanings were actually trained. The verb to fly was not trained. For the word "beat", which was not included in the set of training stimuli, the subject offered the vebetable beet as another definition, in addition to tired, as in "I'm beat". "Tired" was previously associated with the word "run-down". Her third meaning was "to fight" or "beat someone up". Yet another interesting example was that the trained meanings for "hold-up" was a robbery and to support/elevate. On the delayed assessment, the subject produced a novel definition for hold-up: wait; "people go fast and you're slow and the other one say 'hold-up'".

Discussion

The results of this experiment demonstrated that metalinguistic awareness can be facilitated within the clinical setting.

In particular, the subject learned to formulate definitions of words, to recognize words as ambiguous in isolation as well as in sentential contexts; and to supply at least two definitions for most of the ambiguous items that were identified. Both immediate and delayed post-training assessments indicated that the subject's performance was stable for trained words. Furthermore, an inspection of the data for previously tested but untrained words, as well as for totally new words, indicated that learning had generalized.

It can be concluded that the training program was an effective and efficient clinical instrument with apparent application for school-age children who have language disorders. The program's effectiveness with a Down's Syndrome child has implications for the kind of training that can be accomplished with that population. Given the late age at which early metalinguistic skills are emergent in the Down's Syndrome population, without clinical intervention later-developing linguistic awareness may not be acquired, precluding these children from ever becoming effective communicators.

A somewhat unexpected result of this study was the failure of the subject to demonstrate comprehension of riddles based on lexical ambiguity after completing the training program. The literature has indicated that both the ability to understand lexical ambiguities (Keil, 1980; Shultz and Pilon, 1973) and the ability to comprehend lexically based humor (McGhee, 1971; Shultz and Horibe, 1974) develop at the same time, between the ages of seven and nine. Furthermore, previous data collected by one of the current authors (Schwartz, unpublished) indicated that spontaneous comprehension of lexically based humor occurred immediately after training. Several possible explanations can account for this result.

The discrepancy between the subject's performance in this study and reported results may be a reflection of the differences that obtain among the populations under consideration. Thus, for example, learning-disabled children may not acquire a particular metalinguistic skill spontaneously; however, once trained, abstract behavior predicated on this skill may emerge spontaneously. With the normal population neither the skill nor the consequent language behaviors may need to be trained. In other words, different populations may exhibit different learning styles. Similarly, this discrepant result could be attributed to the individual learning style of the subject.

While no clear evidence for lexical riddle comprehension was exhibited on the post-training assessments, the subject did produce a spontaneous joke based on lexical ambiguity. (We have a new baby, and I'm an aunt. And you're an ant!" she exclaimed while crawling on the floor.) In addition, she did express more awareness of the locus of the humor post-experimentally than pre-experimentally. According to McGhee (1974), the ability to verbally explain a riddle occurs late in the developmental sequence; it rarely occurs before age twelve, and it doesn't correlate with other measures of humor comprehension. Therefore, the failure may have been in the subject's ability to explicate these riddles, rather than in her ability to understand them. Thus the apparent lack of humor comprehension could be attributed to the way that humor comprehension was measured in this study.

Another interesting explanation of the subject's inability to understand lexical riddles derives from the Three-Stage Theory of Ambiguous Sentence Processing proposed by Frommer (1975). Frommer identified an intermediate stage in ambiguous sentence processing associated with the six year olds of his study. These Stage Two children "may be in transition between pre-operational and concrete operational stages" of cognitive development. (p. 113) They evidence an "increased tendency for both meanings (of an ambiguous word) to be present when a context is supplied." (p. 103) However, while a child at this stage is "capable of decentering from his initial semantic bias for the moment,.... (he) cannot maintain this reversibility of thought." (p. 113) He "cannot suppress his original or preferred semantic interpretation." (p. 103) Similarly, Shultz and Horibe (1974) have reported that six to eight year old children appear to be in a transition between preferring pure incongruity and preferring resolvable incongruity in humor appreciation and comprehension. Frommer (1975) has suggested that a prior-linguistic

context is more useful for children than a post-linguistic context in serving to disambiguate discourse. Riddles supply "a prior linguistic context which fools the listener into searching for the answer within a category which is a dead end." (p. 31) The contextual cues in lexical jokes first bias the listener in one direction in the set-up, and then bias him toward the other meaning in the punchline. The listener is forced to switch from one interpretation to the other. The 'interpretative switch' appears to be a salient component of humor. (Hirsh-Pasek, Gleitman, and Gleitman, 1980). In order to understand the riddle, the ambiguous element must be reprocessed. The child must not only be able to realize the duality of meaning involved, but also be able to mentally switch back and forth rapidly in order to resolve the incongruity.

The subject of this study appears to be at Frommer's Stage Two. That is, she has acquired an ambiguity recognition skill; however, she appears either to be unable to mentally switch back and forth between the two meanings rapidly in the absence of a visual context[1] ; or to be unable to relate a lexically ambiguous item to both the prior- and post-linguistic contexts found in riddles or humorous stories. These are empirical claims which require further investigation.

The clinical implications of this study can be summarized as follows. The major finding that metalinguistic awareness can be facilitated within the clinical setting implies that clinical procedures can be expanded beyond teaching the formal components - syntax, semantics, and phonology - of the language system. That this can be accomplished with children who continue to exhibit language deficits is of particular importance. This implies that we can enrich the communicative capacities of these children; opening up new vistas and enlargening the scope of their experiences. This approach is consonant with the view espoused by those who work within the framework of pragmatics. That is, the goal of clinical intervention is to increase an individual's capacity to communicate. Communication is a multi-faceted behavior. As we move away from the tendency to perfect the formal language system before addressing the other aspects of communicative behavior, we increase our chances of accomplishing our goal.

The secondary findings which emerge from this study serve to remind us that in constructing or adapting clinical procedures for individual clients or particular populations we must not lose sight of the specific characteristics which should determine the types of strategies we select for teaching. In the current study, the slow, inflexible learning style of the subject (or the population which she represents) may have caused her to stabilize at an intermediate stage of comprehension, requiring further clinical intervention to move her beyond ambiguity recognition to the more abstract manifestations of this skill. This work is in preparation.

Finally, the significance of this experiment and similar projects is in their attempt to bridge the gap between theoretical claims and

clinical procedures. It is believed that attempts to test current developmental theories in the clinical setting will give rise to more effective rehabilitation procedures, and will provide insight for refining theoretical hypotheses.

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[1]In accordance with Shultz and Pilon (1973), we have also found that the use of a non-linguistic context, i.e., pictures, served to facilitate ambiguity detection. The subject consistently experienced increased difficulty during Step 5 of the Training Program when the pictures were eliminated.

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Appendix A-1

Pre-training Assessment
Judgment of Anomolous Sentence Structures

The following is a list of objects used and actions demonstrated during the administration of this assessment procedure:

male doll	female doll
truck	comb
glasses	pink duck
variously shaped blocks	different sized barrels
variously colored beads	variously colored cups
various crayons	various balloons
frog	car
walking	sitting
dancing	jumping
hopping	holding
standing	lying down

Level A:

Judgment of sentences with context present.

1. Is this a noun? Vary the noun.
2. Is the woman verbing? Vary the verb demonstrated.
3. Is this an adjective noun? Vary the adjective only.
4. Is this an adjective noun? Vary both the adjective and the noun.
5. Is the doll holding a noun? Vary only the noun.
6. Is the actor holding a noun? Vary the actor and noun only.
7. Is the actor verbing a noun? Vary the actor, verb and noun.
8. Is the noun on the box? Vary the noun.
9. Is the balloon on the object of the preposition? Vary the object of the preposition.
10. Is the frog preposition the box? Vary the preposition only.
11. Is the noun preposition the box? Vary the noun and the preposition.
12. Is the noun preposition the object of the preposition? Vary the noun, the preposition and the object of the preposition.

Level B:

Judgment of declarative sentence structures with action context present. Does this show "The declarative sentence"? Use the same twelve sentence structures as outlined above.

Level C:

Judgment of anomolous declarative sentence structures with pictorial context present. Does this show "The declarative sentence"? Present the same twelve sentence structures as outlined in Level A above.

Level D:

Judgment of anomolous declarative sentence structures with no context present. Does this sound good? "The declarative sentence". Verbally present the sentence stimuli.

Anomolous and Controlled Sentences by Type

Anomolous sentences containing semantic violations

1. The dog is eating the bone.
2. The car is washing the windows.
3. The cookie eats the little boy.
4. The bus is riding down the street.
5. The pink flower was pretty.
6. The brown horse was purple.

Anomolous sentences containing syntactic violations

1. The three boys was eating lunch.
2. Yesterday Mommy jump over the rock.
3. The three girls played house yesterday.
4. Tomorrow Amy painted a picture.
5. One boy were playing ball.
6. Yesterday the girls were watching T.V.
7. Mommy cook dinner for her babies.
8. Miss Wendy teaches speech class.

Anomolous sentences containing pragmatic violations

1. The mailman puts out the fire.
2. The bus driver drives the children to school
3. The baby is crying for her bottle.
4. The grandmother is sucking her thumb.
5. The dog is biting the boy's foot.
6. The girl is kissing the snake.

Appendix A-2

Definition Training Program

The following pictures were presented as the stimuli:

Step I: Chair and bed
Sneakers and hat
Boat and car

Step II: Bed and chair
Bird and fish
Bathing suit and pajamas

Step III: Raincoat
Boat
Sofa
Cake
Plane

Goal: To train the linguistic formulation of a definition.

Step 1. Pair similar items.
(a) Ask "How are these items the same?"
(b) Ask "How is item A different from item B?"
(c) Ask "What is a item A?"; "What is a item B?"
Appropriate definition should include superordinate category and specific differentiating feature(s).

Step II: Pair similar items. The subject is requested to give appropriate definitions.

Step III: Present single item. The subject is required to give an appropriate definition.

Appendix B

Baseline Materials

Riddles

1. (P) What's a good way to keep a dog off the street?
   Put him in a barking lot.
2. (L) Why is it hard to talk with a goat around?
   Because he always butts in.***
3. (N) What hurts more than a giraffe with a sore throat?
   A caterpillar with sore feet.***
4. (L) Why are fish so smart?
   Because they always go around in schools.*
5. (P) If you put three ducks in a box, what would you have?
   A box of quackers.
6. (S) Would you rather have an elephant chase you or a lion?
   I would rather have the elephant chase the lion.
7. (L) What is better than a dog that can count?
   A spelling bee.***
8. (N) Why does a humming bird hum?
   Because he doesn't know the words.***
9. (P) When did the fly fly?
   When the spider spied her.
10. (S) What kinds of animals can jump higher than a house?
    All kinds of animals; houses can't jump.
11. (L) What did the big firecracker say to the little firecracker?
    My pop is bigger than your pop.***
12. (P) What's the difference between a hill and a pill?
    One is hard to get up, and the other is hard to get down.
13. (L) What holds up a train?
    Bad guys.***
14. (N) When is it OK to drink milk from a dish?
    When you're a cat.
15. (P) What's the difference between a tuna fish and a piano?
    You can tune a piano, but you can't tune a fish (tune fish).
16. (L) When is a cook bad?
    When he beats the eggs.***
17. (S) How can you keep fish from smelling?
    Cut off their noses.
18. (N) What's worse than finding a worm in an apple?
    Finding half a worm.
19. (L) What color would you paint the sun?
    The sun rose.*
20. (S) What's the difference between a zoo and a deli?
    In a zoo you can see a man-eating lion, but you have to go to a deli to see a man eating fish.
21. (L) What's the difference between a fly and a mosquito?
    You can't sew a zipper on a mosquito.***
22. (N) Why did Robin Hood rob only the rich?
    Because the poor had no money.

23. (L) Why did the mother knit her son three socks?
Because he wrote that he had grown another foot.***

24. (P) Why will you never be hungry in the desert?
Because of the sand which is (sandwiches) there.

25. (L) How can you make pants last
Make the jacket and vest first.***

26. (S) Call me a cab.
OK, you're a cab.

27. (N) Who has the most friends for lunch?
A cannibal.*

28. (L) If you wake up in the middle of the night and you're thirsty, what should you do?
Look under the bed and find the spring.**

29. (L) What's the best thing to take when you're run-down?
The license number of the car that hit you.** - ***

30. (L) What has four wheels and flies?
A garbage truck.** - ***

31. (S) Did you ever see an ice cream stand?**

32. (S) Did you ever see a sleeping bag?**

33. (S) Did you ever see a hot dog?**

P Phonological riddle
L lexical riddle
S Structural riddle
N Non-ambiguous riddle

* Riddle included in pre-training baseline only.
** Riddle included in post-training assessment only.
*** Riddle also used in delayed assessment.

Appendix B

Baseline Materials

Ambiguous Sentences

1. The fly got stuck and couldn't move.*
2. The big monster's nose was a foot.*
3. The hen was sad because mother beat the eggs.*
4. The boy saw the school when he was fishing.*
5. All the butting in gave the girl a headache.*
6. The children were surprised by the spelling bee.*
7. My pop is better than your pop.*
8. The strong man holds up the train every month.*
9. The girl felt sad because she was run-down.*
10. The girl was surprised to find a spring in the field.*
11. The coat was the highest on the rack.
12. Mommy made her cupcake last.*
13. He gave the bat to a boy in the park.
14. The man took a pipe from the rack.
15. The glasses were on the table.
16. Jane broke three nails during woodshop class.
17. The thin girl was run-down.*
18. The careful tailor made his pants last.* - ***
19. The cold made Frank's uncle miserable.**
20. The cold made Frank's uncle sad.**
21. The cold made the boy feel bad.***

* Ambiguous word in sentence was derived from riddle.
** Comprised pre-training baseline stimuli only.
*** Comprised post-training assessment only.

Appendix B

Baseline Materials

Lexical Ambiguities

1. Classes
2. Nails
3. Spelling bee
4. Run-down
5. Holds up
6. Fly
7. Foot
8. Spring
9. Butting in
10. Pop
11. Highest
12. Last
13. Bat
14. Pipe
15. Cold
16. Beat
17. School

New Stimuli, Delayed Assessment

Ambiguous Items	Non-ambiguous Items
1. Watch	1. Telephone
2. Fan	2. Dancing
3. Pear/Pair	3. Giraffe
4. Son/Sun	4. Pencil
5. Flour/Flower	5. Summer
6. Match	6. Elephant
7. Blue/Blew	7. Scissor
8. Meet/Meat	8. Umbrella
9. One/Won	9. Sewing
10. Week/Weak	10. Toaster

Appendix C

Stimuli for
Lexical Ambiguity Training Program

1. Glasses:
   Expected: The boy could see better when he wore his glasses.
   Unexpected: All the children drank milk from their glasses.
   Ambiguous: The glasses were on the table.

2. Nails:
   Expected: The girl put polish on her nails.
   Unexpected: The boy hammered three nails in the wall so that he could hang up the picture.
   Ambiguous: Jane broke three nails during woodshop class.

3. Spelling Bee:
   Expected: The girl won the spelling bee at school.
   Unexpected: The spelling bee stung the boy.
   Ambiguous: The children were surprised by the spelling bee.

4. Run-Down:
   Expected: Cross at the green light so you don't get run-down by the cars.
   Unexpected: If you eat well and go to sleep early, you won't get run-down.
   Ambiguous: The girl was sad because she was run-down.

5. Holds-Up:
   Expected: The robber holds-up the bank.
   Unexpected: The woman holds-up the big dog house.
   Ambiguous: The strong man holds-up the train every month.

6. Fly:
   Expected: The fly sat on my head.
   Unexpected: I close my pants by zippering the fly.
   Ambiguous: The fly got stuck and couldn't move.

7. Foot:
   Expected: I put a shoe on my foot.
   Unexpected: The flower grew to be one foot tall.
   Ambiguous: The big monster's nose was a foot.

Lexical Ambiguity Training Program

1. Present ambiguous word with written word and two pictures depicting both meanings.
   Present one disambiguating sentence of the unexpected meaning.
   Ask subject: "Which picture am I talking about?"
   Correct response: pointing to correct picture.
   Stimulus: "Tell me a sentence that shows the meaning of the other picture." (expected meaning)
   Response: appropriate disambiguating sentence.
   If the subject does poorly, model both sentences, having the subject point to the correct picture after each model. Re-do Step 1,

maximum of three trials. If the subject experiences continued failure, have a second clinician model for a maximum of two trials with the subject re-trying in between second clinician's first and second model. Total trials = 5.
If the subject fails after five trials, abort word and select a new word. The subject is permitted to imitate sentences directly after modeling.

2. Present ambiguous word with written word and two pictures depicting both meanings.
Present one disambiguating sentence of the expected meaning.
Stimulus: "Which picture am I talking about?"
Response: pointing to correct picture.
Stimulus: "Tell me a sentence that shows the meaning of the other picture."
Response: Appropriate disambiguating sentence of the unexpected meaning.
If the subject does poorly on any portion, model correct response and re-do Step 2 for a maximum of three trials. If the subject fails, go to Step 1. Then repeat Step 2 for a maximum of two trials. Maximum total trials = 5. The subject is permitted to imitate sentences directly after modeling.

3. Point to picture of the expected word.
Stimulus: "Tell me a sentence using this word so that 'name of second clinician' knows which picture I pointed to."
Response: Appropriate sentence. (Have second clinician point to the appropriate picture as reinforcement.)
If the subject does poorly, model correct sentence. Re-do Step 3 for a maximum of three trials. If difficulty continues, re-do Steps 2 and 3 for a maximum of two trials. Maximum total trials = 5.

4. Point to picture of the unexpected word.
Stimulus: "Tell me a sentence using this word so that 'name of second clinician' knows which picture I pointed to."
Response: Appropriate sentence. (Have clinician 2 point to the appropriate picture as reinforcement.)
If the subject does poorly, model correct sentence. Re-do Step 4, three trials maximum. If the subject experiences continued failure, re-do Step 3, then Step 4 for a maximum of two trials. Total maximum number of trials = 5.

5. Eliminate pictures. This is a big transition.
Verbally present the stimulus word.
Say a disambiguating sentence conveying the unexpected meaning of the word.
Stimulus: "Tell me a sentence using the word '____' that shows the other meaning of the word." (expected)
Response: Appropriate disambiguating sentence conveying the expected meaning.

If the subject fails, model and repeat Step 5 for three trials. If the subject continues to respond unsatisfactorily, repeat Steps 3, 4 and 5 for a maximum of two trials. If the subject continues to experience difficulty, model Step 5 with clinician 2 for three trials. Total maximum number of trials = 8.

6. Eliminate pictures.
   Present stimulus word orally.
   Say a disambiguating sentence conveying the expected meaning of the word.
   Stimulus: "Tell me a sentence using the word '____' that shows the other meaning of the word."
   Response: Appropriate disambiguating sentence showing the unexpected meaning of the word.
   If the subject fails, model correct sentence for a maximum of three trials. If poor performance continues, repeat Step 5 for a maximum of two trials. Maximum = 5 trials.

7. Verbally present ambiguous word.
   Stimulus: "Tell me two different sentences that show the two different meanings of the word '____'."
   Response: Two appropriate sentences.
   If the subject fails, re-do Steps 5, 6 and 7 for three trials. If failure sontinues, model correct sentences for two trials. Maximum number of trials = 5.

8. Verbally present ambiguous sentence.
   Stimulus: (a) "Which word in the sentence has two meanings?"
   (b) "Tell me two different sentences that show the two different meanings of the word '____'."
   Response: Appropriate word and sentences.
   If the subject fails, re-do Step 7 for a maximum of three trials.
   If the subject continues to fai, model correct sentences for a maximum of two trials. Total = 5 trials.

9. Verbally present ambiguous sentence.
   Stimulus: (a) "Which word in the sentence has two meanings?"
   (b) "Keep the sentence the same, but add to it so that I know which meaning you're talking about."
   Response: Appropriate word and sentence.
   If the subject fails, model correct response for five trials.

10. Probe with new word.
    Verbally present new ambiguous sentence.
    Stimulus: "Which word in the sentence has two meanings?"
    If response is correct, continue the probe: "Tell me two different sentences that show the two different meanings of the word '____'."
    If response is correct, select a new training word, and re-administer the probe with the new word.
    If response is not adequate, begin the training program with the new word.

Effects of age and sex on the self assessment of hearing handicap

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Abstract

This study examined the relations between the audiological test battery and self assessment as determined by two scales, the HHS and the HHIE. In addition to standard audiometric measures, PB words were presented at 50 dB HTL in sound field under the following three conditions: 1: Quiet, 2: White noise (S/N=0), and 3: White noise (S/N=0) plus visual cues. The data were analyzed to determine whether the relations varied as a function of age and/or sex. Correlation coefficients revealed that self assessment scores as determined by the HHS are significantly related to audiometric measures in the 70-79 decade and in males. No significant correlations were obtained when the HHIE was employed. Visual cues did not provide any additional information with regards to these relations.

Hearing impairment as defined by ASHA refers to "a deviation or change for the worse in either auditory structure or auditory function, usually outside the range of normal." (ASHA, 1981a). This must be differentiated from the term hearing handicap which deals with the effects the person's physical disability have on his everyday functioning. The routine audiological test battery focuses on evaluating an individual's hearing handicap. Whereas hearing impairment has a physiological basis and is therefore relatively easy to measure, hearing handicap is comprised of many factors intricately interrelated, making quantification difficult. ASHA lists the following factors as contributing to the handicapping condition:

1. present age of the individual
2. age of the individual when the impairment was first discovered
3. age of the person when the impairment developed
4. nature and extent of the hearing impairment
5. person's communicative needs and the nature of the settings in which communication occurs
6. the relationship of the hearing impairment to other physical or mental impairments
7. the amount and success of rehabilitative treatment already received

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8. the individual's reaction and the reaction of others to his or her impaired hearing, and

9. the effect of the hearing impairment on the individual's expressive communicative ability (ASHA, 1981a).

In recent years there has been increasing interest concerning the assessment of hearing handicap. Thus, several scales have been developed which attempt to measure this phenomenon. In general, it appears that each scale tends to focus on one of two main aspects which hearing handicap encompasses; i.d., situational and psychosocial problems. Questions on the Hearing Handicap Scale (HHS) (High, Fairbanks and Glorig, 1964), Hearing Measurement Scale (HMS) (Noble and Atherly, 1970), Social Hearing Handicap Index (SHI) (Ewertson and Birk-Nielsen, 1973), and Hearing Performance Inventory (HPI) Giolas, Owen and Schubert, 1979) deal primarily with specific communication difficulties in a variety of situations, whereas questions on the Denver Scale of Communication Function (Alpiner, 1971) and the newly developed Hearing Handicap Inventory for the Elderly (Ventry and Weinstein, 1981) probe the psychosocial consequences of hearing impairment. There is no scale available which adequately incorporates both aspects.

Of the scales developed to assess specific situational difficulties, there are several reasons why the HHS seems to have the greatest potential for wide-spread clinical use. Perhaps one of the most important factors to consider is the limitation of time in most clinical settings. The HHS can be administered and scored within 5 - 10 minutes whereas the HPI requires one full hour under optimal conditions. This is not to negate the value of the HPI; rather, its extensive nature is more applicable for those enrolled in a rehabilitation program where time constraints are not imposed. The SHI and the HMS were also designed to pinpoint problem areas in everyday communication. However, the SHI was constructed in Danish and there is no valid English translation available. The use of the HMS is limited by the fact that it was exclusively developed for and standardized on a population with noise induced hearing loss. Therefore, its' validity when administered to other hearing impaired populations cannot be guaranteed.

As stated previously, the psychosocial impact of hearing impairment on the individual is explored by the Denver Scale of Communication Function and the HHIE. Research regarding the former suggests that its' reliability must be re-assessed (Kaplan, Feeley and Brown, 1978). On the other hand, the authors of the latter self-assessment scale obtained a high overall reliability using Chronbach's alpha (.95) as well as a high split half reliability using the Spearman Prown formulas (.95). Like the HHS, the HHIE also conforms to logistic considerations, making it too a potentially useful clinical tool.

What is the relationship between hearing handicap measures and audiometric test results? Several investigations have addressed this question. A summary of the results from various studies is proveded on Table 1.

Table 1. Results of studies on the relationship between hearing handicap measures and audiometric test results.

Studies	PTA	SRT	PB	HHS	HHS/ PTA	HHS/ SRT	HHS/ PB	PRESENTATION LEVEL
High et.al.	30.4	35.6	88.8	111.0	.65**	.70**	-.15	40 dB SL
Show & Tannahill	21.1	NG*	88.0	29.9	.73**	NG*	-.20	40 dB SL
Berkowitz & Hochberg	36.08	36.25	77.5	45.31	.57**	.56**	-.30**	35 dB SL
McCartney et. al.	42.91	41.22	71.02	41.63	.62**	.40**	-.44**	MCL
Tannahill	NG*	39.16	42.58	51.56	.NG*	.59**	-.73**	45 dB HTL ***

*= Not given.
**= Significant to the .05 level of confidence or better.
***= Presented in sound field.

High et. al. (1964) administered the HHS to fifty hearing impaired subjects ranging in age from 21 to 72. Thirty-two males and 18 females participated in this study. Audiometric data, i.e., PTA, SRT and speech discrimination scores were obtained for each ear. Only two of these measures, PTA and SRT in the better ear, yielded correlations high enough to have practical significance. Virtually no relationship was found between the self assessment scale and speech discrimination scores. The authors conclude, "It is evident from these relationships that better ear hearing sensitivity per se is probably the major determinant of hearing handicap as measured here." (p. 227). The findings of Schow and Tannahill (1977) concur with these results.

Two additional studies which support the initial finding that the HHS is more closely associated with pure tone sensitivity than clinical discrimination measures were conducted by Berkowitz and Hochberg (1971) and McCartney, Maurer and Sorenson (1976). Both used a geriatric sample. Subjects in the former study ranged in age from 60 - 87 years ($\bar{x}$ = 70) and subjects in the latter study ranged from 62 - 89 ($\bar{x}$ = 75). Once again, the highest correlations were found between the HHS and PTA[1]; however, unlike the findings previously discussed, statistical significance was reached when handicap scores were correlated with speech discrimination measures. One possible explanation for this discrepancy concerns the method employed for obtaining the speech discrimination scores. Various presentation levels were incorporated into the procedures. High et. al., (1964) and Schow and Tannahill (1977) administered words at 40 dB SL RE: SRT, Berkowitz and Hochberg (1971) used 35 dB SL RE: SRT and McCartney et. al.(1976) delivered the speech at the patient's most comfortable listening level which averaged 25 dB SL RE: SRT. The possibility that PB max was not reached in the latter two studies cannot be ruled out since research indicates that one fixed level of presentation does not guarantee PB max in patients with sensorineural hearing loss (Posner and Ventry, 1977). This being the case, it is conceivable that the resulting correlations would be affected.

[1]It is interesting to note that McCartney obtained a comparatively low correlation between the HHS and SRT. The authors speculate that this may have been an "artifact" of their study.

Tannahill (1979) investigated the use of the Hearing Handicap Scale in terms of assessing hearing aid benefit. Unlike other researchers who presented word lists at a fixed sensation level relative to the speech reception threshold, Tannahill delivered the speech material at a fixed level of 45 dB HTL. The rationale for this procedure was based on the philosophy that "word identification at conversational level more nearly represents real-life listening," (p. 93). In addition, testing was conducted in a sound field which also more closely approximates a realistic environment. Since the HHS was designed to measure communication difficulty in common listening situations, one may expect the relation between self perceived handicap and PB score to be higher when the latter method is used as opposed to the more idealistic measure obtained when a fixed sensation level is employed. Analysis of Tannahill's data supports this hypothesis. A high product moment correlation of -.73 ($p < .01$) was obtained between Pre Aid PB scores and HHS ratings. This finding suggests that PB max scores are not measuring true communicative abilities in daily living and therefore are of minimal value when assessing hearing handicap.

In addition to the Hearing Handicap Scale, Marcus (1981) administered the newly developed Hearing Handicap Inventory for the Elderly (HHIE) to a geriatric population. Correlations between self perceived handicap and audiometric measures were obtained for both scales. Discrimination lists were presented under three conditions: at 40 dB SL under headphones, at 50 dB HTL in a quiet sound field, and at 50 dB HTL in a sound field with white noise (S/N=0). In agreement with previous studies, the HHS was found to be more highly correlated with sensitivity measures than speech discrimination tasks. Furthermore, correlations with the HHS remained essentially the same regardless of the discrimination task involved. Conversely, the HHIE correlations were identical for SRT and speech delivered under earphones. Higher correlations were obtained for the two more difficult speech presentations (sound field in quiet and noise). Marcus speculates that the two scales assess different aspects of the individual's handicap, the HHS being responsive to the sensitivity component and the HHIE responsive to differences in communicative handicap.

The possibility that the HHS and the HHIE are dealing with different aspects of hearing handicap certainly is feasible. (Recall the initial portion of this paper which discussed the numerous factors contributing to the handicapping condition). However, definitive conclusions regarding differences between scales and their relationship to audiometric measures must be reserved until further research is conducted. Large discrepancies between results of the studies completed thus far must be investigated. One example of such a discrepancy is the variation in HHS to PB score correlations which range from -.5 (high et al., 1964) to -.73 (Tannahill,1979). In addition, review of the literature reveals that several factors have not even been addressed.

Although it is generally acknowledged that the age and sex of subjects tested may influence the results, existing studies on self-perceived handicap have generally not attempted to control for these variables. While some researchers have found virtually no relation between age and handicap

scores, (Ewertson and Birk-Nielsen, 1973; Ventry and Weinstein, 1981), the relation between these scales and audiometric measures as a function of age has not been considered. Berkowitz and Hochberg (1971) presented their data according to age and sex. Differences in correlations between the HHS and audiologic results were observed, e.g., HHS to PB score correlations were -.43 (significant) and -.13 (not significant) for males and females, respectively. Such variations, though noted, were not addressed in the discussion of their results.

The development of the HHIE represents acknowledgement of the fact that as people age, their abilities and needs change. Physiological changes due to aging can effect a variety of functions such as short term memory skills, latency of responses and the ability to follow directions. Furthermore, the incidence of hearing loss increases significantly as a function of age (Maurer and Rupp, 1979) and a loss of hearing acuity has been associated with reduced scores on measures of intellectual abilities (Granick, Kleban and Weiss, 1976). Taking these factors into consideration, Ventry (1981) questioned the application of existing self assessment scales to the elderly population. "Items may be inappropriate, wording too complicated and length too long for use with an older population" (p. 4). Thus, the HHIE was designed exclusively for geriatric patients. Unfortunately the authors failed to use a control group. The scale has not been administered to those under the age of 65. The presence of such a control group would have shown conclusively that the scale is directed towards problems and needs unique to the elderly population. The absence of such a control leaves the applicability of the scale to other age groups open for investigation.

Marcus suggests that low correlations between the handicap scales and speech discrimination scores may occur "because the discrimination tests aren't measuring real-life communication function" (p. 1). It is true that people seldom sit in sound-treated rooms and repeat back monosyllabic words. Background noise is present in even the quietest listening situation. An additional consideration is that visual cues are often used to supplement auditory cues, particularly in difficult listening situations. Many hearing impaired individual's develop speech reading skills to help compensate for loss of hearing acuity (Erber, 1975; Ewertson and Birk-Nielsen, 1971). It may be necessary to alter testing procedures, i.e., to include visual cues as part of the discrimination task, to obtain more accurate measures of everyday functioning. Interestingly, Ewertson and Birk-Nielsen (1973) found that "the capacity of lip reading had a definite influence on hearing handicap as measured by the SHI" (p. 186). However, specific data were not reported. As of this writing, no research is available which has explored this factor in relation to either HHS or HHIE scores.

In view of these considerations, the authors of this paper felt that further investigation of the self assessment scales presented here was warranted. This research was initiated and designed to:

1. explore possible differences in the relationship between handicap measures and audiometric measures as a funcation of age and sex.

2. evaluate the performance on the HHIE when administered to a sample which is younger than the population for which the scale was intended.

3. to determine whether or not variations in word list presentation affects the correlation between self perceived handicap measures and speech discrimination scores.

Method

Subjects:

Subjects included 36 hearing impaired adults ranging in age from 50 to 70 years with a mean age of 65.5 years. There was an equal distribution by number and sex in each of the 10-year spans 50 - 59, 60 - 69, and 70 - 79. Table 2 shows the distribution of subjects according to decade, and mean age. The subjects were randomly chosen from the clinical population evaluated at the Queens College Speech and Hearing Center and inclusion in this study was based on the following criteria: a) sensorineural hearing loss with an SRT which did not exceed 50 dB HTL, b) free from gross neurological, psychological and visual handicaps, and c) possess no prior hearing aid experience.

Table 2.

N.	Span in Years	Mean Age
12	50 - 59	54.2
12	60 - 69	64.8
12	70 - 79	75.1
36	Total	64.7

Apparatus:

Audiologic Tests. A Grason-Stadler Model 1701 two channel audiometer, TSH-49 earphones and an American Electrometics Impedance Bridge were utilized in a sound-treated two-room suite to determine all audiometric measures. Central Institute for the Deaf (CID) W-1 and W-22 Lists 1A, 2A and 4A were used to determine speech reception thresholds and speech discrimination scores respectively. Speech reception thresholds were presented through live voice presentation monitored a "0" VU and speech discrimination lists were videotaped by a female speaker using a Panasonic camera and tape deck. The tape was played back through a Sony 25-inch screen T.V. and passed through the Grason-Stadler Model 1701 audiometer for the audio-visual test presentation condition. The audio portion of the video tape was used for the two audio only test conditions. A Bruel and Kjaer model 2203 sound level meter was used to calibrate the equipment before, during and after the experiment. All levels were within the prescribed tolerance limits.

Hearing Handicap Scale (HHS). The HHS was developed by High, Fairbanks and Glorig (1964) in an attempt to devise a clinically useful self assessment tool. The final version consists of items which are limited to assessing everyday listening situations because previous data revealed that "items dealing with auditory difficulties in the job situation, emotional problems, self evaluation of hearing competence, and so on, did not appreciably broaden the measurement properties of the instrument," (High et. al., 1964). Language used in developing the items was kept at a low level of difficulty so that the scale would be appropriate for a wide age range and reduce any effects of intellectual differences among patients. Each item is presented in question form and is answered on a continuum of 1 to 5: 1 representing least difficulty and 5 representing most difficulty. The scale is then scored by summing the integer values and converting this raw score to a percentage score as described by High et. al.(1964). Thus, a low score indicates minimal handicap and a high score indicates maximal handicap.

Hearing Handicap Inventory for the Elderly (HHIE). The HHIE was recently devised by Ventry and Weinstein (1981). The scale consists of 25 questions; 13 of these tap specific situational difficulties while the remaining 12 focus on emotional responses to hearing impairment. All questions were judged to be accurately representative of the activities and situations most often encountered by the geriatric population during daily living. The response set involved is a simple choice of yes (4 points), no (0 points) or sometimes (2 points). Scoring is accomplished by multiplying the number of "yes" responses by 4, the number of "sometimes" responses by 2, and then summing the two products for the total score. Thus, scores can range from 0 to 100%, 0 representing no handicap and 100 representing complete handicap.

Procedures

The HHS and HHIE self assessment scales were administered in a face to face interview. Order of presentation was counterbalanced to avoid order effects. The scales were scored as described by their respective authors.

Air and bone conduction thresholds for octave frequencies from 250 through 8000 Hz were obtained under headphones bilaterally using the modified Hughson-Westlake procedure as described by Jerger and Carhart (1962).

Acoustic impedance measures and Olsen Noffsinger tone decay screening were conducted in order to eliminate those with possible conductive or retrocochlear pathologies.

Speech reception thresholds (SRTs) were measured by live voice presentation of the CID W-1 spondaic word list using the Chaiklin-Ventry procedure. Speech reception thresholds were obtained both under headphones and in a soundfield.

Speech discrimination was tested using the taped version of the CID W-11 Lists 1A, 2A and 4A in sound field under the following conditions:

1. Audio-only presented at 50 dB HTL in quiet.

2. Audio-only presented at 50 dB HTL in a background of white noise using a signal to noise ratio of 0.

3. Audio-visual presented at 50 dB HTL in a background of white noise using a signal to noise ratio of 0.

All three test conditions were presented with the subject seated 3 feet away from the speaker which was situated at 0° azimuth. In addition, all word lists and discrimination test conditions were counterbalanced to reduce the effects of fatigue and visual perception differences among the words on each list.

Results

The data from this experiment are summarized on Tables 3 through 6. Tables 3 and 4 show the means, standard deviations and ranges of audiological measures and hearing handicap scores, according to age and sex respectively. When looking at these data it is apparent that males have consistently more variability on all audiometric and self assessment scores than do females.

Table 3. Means, Standard Deviations and Ranges for Audiological Measures and Self Assessment Scores According to Age Decade

		PTA*	SRT	QUIET	NOISE	VISUAL	HHS**	HHIE
50-59	$\bar{x}$	29.2	27.9	87.2	54.8	85.2	40.9	14.9
N=12	SD	10.7	11.6	13.4	14.6	6.5	8.4	10.7
	Range	8.-48	10-45	56-100	20-70	72-92	26-55	2-33
60-69	$\bar{x}$	25.3	23.9	87.2	46.7	78.2	36.3	16.7
N=12	SD	9.8	9.3	12.2	17.4	12.9	12.7	18.5
	Range	13-41	15-45	66-100	24-72	60-94	22-58	2-68
70-79	$\bar{x}$	29.1	28.3	83.8	53.0	75.3	40.3	6.8
N=12	SD	11.8	8.9	18.8	13.4	18.1	13.4	6.0
	Range	12-53	20-50	28-96	20-70	24-94	25-74	0-18

*= Better ear measures, all other measures were obtained in a sound field.
**= Raw score data.

Table 4. Means, Standard Deviations and Ranges for Audiological Measures and Self Assessment Scores According to Sex.

		PTA*	SRT	QUIET	NOISE	VISUAL	HHS**	HHIE
Males	x	27.3	25.6	83.4	47.8	75.6	40.7	14.1
N=18	SD	12.6	9.7	18.9	16.9	16.4	13.3	16.2
	Ranges	8-53	10-50	28-100	20-72	24-93	22-74	0-68
Females	x	28.4	27.8	88.7	55.2	83.6	37.6	11.5
N=18	SD	8.7	10.3	8.6	12.9	8.9	9.7	9.7
	Ranges	15-43	10-45	68-98	30-70	64-94	24-55	0-38
Total	x	27.8	26.7	86.1	51.5	79.6	39.2	12.8
	SD	10.7	9.9	14.7	15.3	13.6	11.6	13.2
	Ranges	8-53	10-50	28-100	20-70	24-94	22-74	0-68

*= Better ear measures, all other measures were obtained in a sound field.
**= Raw score data.

The Pearson product moment correlation coefficients between the score of each hearing handicap scale and audiometric measures are presented on Table 5. For the total population, significant relations were obtained between the HHS and all audiological results. The table also reveals that these relations vary as a function of age and sex. Specifically, HHS correlations did not reach statistical significance with any measure in the 50-59 age group. whereas, in the 70-79 decade, significant correlations were obtained for the entire test battery. When examining the total population in terms of male vs. female groups, the former showed significant correlations across all audiometric measures. With the exception of the audio-visual test condition, no significant relations were found for the latter group. It is also noteworthy that correlations were seen to vary as a function of discrimination test presentation; that is, when excluding females, the HHS was more highly correlated with PB words presented in quiet than in noise when visual cues were available to the subject.

Table 5. Correlation Coefficients Between the HHS and Audiological Tests According to Age Decade and Sex.

HHS	PTA	SRT	QUIET	NOISE	VISUAL
50-59	.09	.09	-.35	-.25	-.06
60-69	.65*	.48	-.58*	-.23	-.43
70-79	.58*	.56*	-.85**	-.78**	-.80**
Males	.58**	.49*	-.74**	-.46*	-.53*
Females	.35	.36	-.31	-.20	-.53**
Total	.49**	.40**	-.63**	-.38**	-.54**

*= $<.05$
**= $<.01$

Table 6. Correlation Coefficients Between the HHIE and Audiological Tests According to Age Decade and Sex.

HHIE	PTA	SRT	QUIET	NOISE	VISUAL
50-59	-.06	-.13	-.08	-.09	-.09
60-69	.35	-.03	-.35	-.19	-.30
70-79	.19	.25	-.29	-.37	-.45
Males	.15	-.14	-.22	-.25	-.13
Females	.09	.06	.11	-.04	-.16
Total	.12	-.07	-.16	-.20	-.16

Unlike the HHS, Table 6 reveals that subjects performance on audiometric tests were not significantly related to self assessment scores as measured by the HHIE. It is interesting to note that even though none of these correlations reached statistical significance, the relation tended to increase with an increase in age.

Discussion

Previous investigations have found significant correlations between the HHS and audiometric test results (Berkowitz and Hochberg, 1971; High et al., 1964; Schow and Tannahill, 1977; and Tannahill, 1979). Marcus (1981) obtained significant correlations when two scales, the HHS and HHIE were employed. Based on these findings the present study was conducted to explore how these relations vary as a function of age and/or sex. Such an approach presupposes that significant correlations between the self assessment scores and audiologic test results do in fact exist. However, in the present study, HHIE correlation coefficients did not reach statistical significance (see Table 6). Although it is impossible to delineate all the contributing factors accounting for this discrepancy, differences in the subjects used in each study may be at least partially responsible for this inconsistency. The subjects employed for the present investigation primarily manifested a mild to moderate high frequency sensorineural hearing loss. This is in contrast to other studies in which subjects with more severe impairments were tested. These findings imply that the HHIE is not sensitive to the handicapping effects of mild hearing losses.

As previously stated, this study attempted to evaluate the performance on the HHIE when administered to a sample younger than the population for which the scale was intended. Although none of the HHIE correlations reached statistical significance, examination of the group data shown on Table 6 indicates that the correlations progressively increase with increasing age. This supports the notion that the HHIE is more applicable to the elderly population for which it was designed. Perhaps with a larger sample statistical significance would have been reached for the 70-79 age group.

Unlike the negligible HHIE correlations, significant relations between the HHS and all audiometric tests were obtained for the total population. The results from the present study (see Table 5) are consistent

with those reported by Tannahill (1979) where the highest correlations were obtained between the HHS and speech discrimination scores in quiet. Looking at Table 1, these finding appear to contradict those of previous studies in which the HHS was highly related to sensitivity measures, i.e., SRT and PTA, as opposed to discrimination measures. When interpreting these results, one must consider the similarity in testing procedure between Tannahill (1979) and the present investigation and recognize how these procedures differed from those employed by other investigators. Until recently, discrimination scores were measured under headphones at levels which would presumably yield PB max. Such scores ideally reflect the person's potential communicative abilities and are prognostically useful. However, when attempting to assess actual communicative abilities, one must consider that normal conversational levels are not at 40 dB SL re: SRT for the hearing impaired person. Thus the authors of this study, in agreement with Tannahill (1979), chose a presentation level which would more closely approximate that encountered in daily living situations. The higher correlations obtained when using the latter procedure substantiates this rationale.

When attempting to simulate real-life situations, one must not ignore the fact that background noises often interfere with the ability to hear the message and visual cues are often utilized to compensate for this loss. Thus, it was hypothesized that the addition of noise and/or visual cues to the presentation of word lists would provide a more natural listening condition. One would expect the handicap scale scores to be more highly correlated with these measures. Surprisingly, the highest correlations were obtained when speech was presented in quiet. The fact that the noise and audiovisual presentations did not provide any additional information with regard to these relations may be a function of the discrimination task involved. One possible explanation is that a "redundancy to asking trade-off" may exist. That is to say, the external redundancy inherent in normal discourse is markedly reduced in clinically used monosyllabic words. Therefore, the addition of masking noise may not be providing a more realistic listening situation; rather, it may be much too difficult. The authors of this paper believe that the utilization of monosyllabic words when attempting to evaluate every-day communication abilities may be inadequate. Perhaps the use of the CID sentence discrimination task would yield better results. This topis should be the focus of a future investigation.

The primary focus of this investigation was to determine whether age or sex affect the correlations between self-assessment and audiometric test results. Our findings (see Table 5) indicate that the relations do vary as a function of these two variables. The highest correlations were obtained for the oldest age group and for males.

Interpretation of these results must be made with caution. Hearing impairment is one of numerous factors contributing to the handicapping condition. Thus one must not assume that high correlations between these measures imply that the self perception of hearing handicap is indeed more accurate. Rather, such relations, if they exist, would provide the audiologist with a basis for estimating how the loss of hearing affects the client. Previous studies have established that such correlations exist.

However, the present investigation suggests that such relations may only be present within select portions of the total population, i.e., in the 70-79 age group and in males. On the basis of this research, it is not possible to isolate the primary variable. That is to say, the possibility that high correlation in one group influence the correlations in the other group cannot be ruled out. Future investigations should be conducted to explore this issue.

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A Descriptive Study of Immediate Echolalia: Semantic/Syntactic and Functional Aspects

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Abstract

The purpose of this study was to document the echolalic behavior of an emotionally disturbed child over a three-month period. The investigators were interested in the selectivity of echolalia, its communicative aspects, as well as how the echolalia functioned as a linguistic acquisition strategy. Such behavior appeared selective with respect to which linguistic form (subject-verb-object, subject-verb, verb-object, subject-object) was imitated. Echolalic responses of the form verb-object were overall the most commonly imitated form and were applied to novel contexts. Towards the end of the study, the more linguistically complex response form (subject-verb-object) increased in frequency as an exact echo as well as in the presence of other linguistic contexts (subject-verb).

Echolalic responses were also noted to serve different communicative functions as measured by the elements of eye gaze, comprehension, and non-verbal actions. The range of functions of the echolalia appeared to undergo change, reflective of language that was less automatic and indicative of greater linguistic processing.

Evidence collected in this study suggests that the subject chose to echo two-constituent utterances before expanding his linguistic repertoire to include three-constituent utterances. Implications for developing training contexts utilizing echolalia in a communicative framework are discussed.

Language acquisition in normal children is thought to be dependent upon specific aspects of social, linguistic and cognitive development. The integration of these skills form the foundation for the child to eventually use language to represent his knowledge in a symbolic manner (Sinclair, 1970; Bruner, 1975; Bates, Benigni, Bretherton, Camaioni and Volteroa, 1977; Bloom and Lahey, 1978).

Bloom and Lahey (1978) suggest that knowledge of and experience with object relations contributes to the child's understanding of objects and their various properties. Sinclair (1970) has suggested that a child, through his experiences, defines objects in terms of their functional properties before he is able to represent them symbolically. This object knowledge is developed during the Piagetian sensori-motor period,

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when children learn about objects and their similar behaviors, through their "organizing activity" (Sinclair, 1970). Single word utterances develop at this stage, and reflect the object concepts which the child has learned.

Observers of young children at play have proposed that prelinguistic skills are trained within parent-child interactions (Bruner, 1975; Bates et. al., 1977). Bruner identified joint activity and joint attention in a play situation where the caretaker and child give and exhange objects. Bruner studied infants' gaze behavior during these interactions and found that gaze varied, dependent upon whether the child was the agent of the action or the recipient. Additionally, it was observed that children vocalized different sounds, depending on whether they were the agent or recipient of the action. This data led to a hypothesis that this joint activity-joint attention behavior was an important prerequisite to language, because it contained an element of turn-taking behavior and prepared the child for eventually engaging in discourse. The pre-linguistic concepts of agent, action and object, learned through play, aid the child in learning the linguistic devices that encode these concepts (Bruner, 1975).

Bloom and Lahey (1978) have proposed that action relations, in which "different objects from different concepts...relate to one another through movements or actions" (p. 134), are the single most important category in early language development. Action relations involve: an agent, that brings about or "does" an action; and an object that is affected by the action. Knowledge of the grammatical relations between the subject and predicate constituents of an utterance underlie children's sentences which express verb relations. Data from longitudinal observations indicates that the semantic-syntactic relations agent-action, action-object, and agent-object occur productively in early two-word utterances (Bloom and Lahey, 1978). It has been postulated that the use of these semantic-syntactic forms indicates that the child has knowledge of the "full form" (agent-action-object) and understands the semantic relations between the individual constituents.

The importance of imitation in language acquisition has been widely debated by psycholinguists and learning theorists. Slobin (1968) observed, with reservation, that "imitations can be grammatically progressive" (p. 439). A grammatical construction that is imitated will appear sometime in the future as a part of the child's spontaneous speech. Bloom, Hood and Lightbown (1974), reached similar conclusions after studying a small number of children longitudinally. Though it is not known why, some children in Bloom et. al.'s study chose to imitate and some chose not to. Those who did imitate did so selectively in regard to content and form, and possibly as a means to learn new lexical items. The children imitated semantic-syntactic relations they were in the process of learning. They did not imitate those individual words or forms they were using productively in their spontaneous speech, or which were too complex given their linguistic level. Bloom et. al. concluded that this is evidence that imitations contribute to grammatical learning. Children process adult input and derive linguistic and non-linguistic (context-related) information (Bloom et. al., 1974; Whitehurst and Vasta, 1975). Clark (1977) notes that some spontaneous imitations

are superior in linguistic structure than free speech and states that these possibly "feed the child gradually with information about syntactic structure" (p. 348). Children's limitations of words and forms that are just emerging in their spontaneous speech indicates that they possess knowledge of the linguistic forms they are encloding and also the content that the form encodes (Bloom and Lahey, 1978).

Another body of literature contends that imitation serves a communicative purpose, rather than primarily teaching semantic-syntactic structures. Rees (1975) concluded that the primary function that imitations serve is communicative. Through imitation, children try to establish and maintain an interaction with an adult. Children's knowledge of the functions of language is so limited, that they know no other way to do so. Rees observed that young children imitate language when they don't know how to respond in a communicative interaction. Imitative behavior may play a critical role in the child's learning to establish and maintain communication. Folger and Chapman (1978) hypothesized that children's imitations of adult's utterances serve an interactive function.

Attempts have been made to apply the research on normal language development to the language disordered population. It has been proposed that social, cognitive and linguistic aspects which are thought to be of importance in facilitating normal language acquisition are somehow disrupted in the language disordered child. This theory has major implications for designing the content and context of language therapy.

The present investigation is concerned with the disordered language production and language use of an emotionally disturbed child. The outstanding characteristic of emotionally disturbed children as reported by Kanner (1943) is their inability to relate themselves in the ordinary way to people and situations. There is a lack of joint attention and joint activity with caretakers, and little of the mutual eye gaze behavior that is observed in normal children (Bruner, 1975; Bates et. cl., 1977). Emotionally disturbed children have their "own, private individualized references" (Kanner, 1946).

Echolalia has been described as a pathognomonic symptom of verbal emotionally disturbed children (Prizant, 1978). Though a variety of descriptive terms have been used, echolalia has generally been defined as the "meaningless repetition of a word or word group just spoken by another person" (Fay and Schuler, 1980, p. 25). However, some researchers have disputed the claim that echolalia is a meaningless language behavior which lacks intentionality. Schuler (1979) has proposed that an echolalic child uses echolalia to create and maintain a communicative interaction. In this way, echolalia indicates a social awareness of discourse rules, and a desire to engage in turn-taking behavior. Schuler has suggested that echolalia is not inherently different from imitation. On a continuum, echolalia represents an abnormal frequency of imitations and repetitions.

In a longitudinal study of the immediate echolalic utterances of four autistic-like children, Prizant (1978) attempted to identify the intentions of these echoic utterances, and their cognitive or communicative

functions. Prizant observed these children in three different contexts over an eight month period, and devised functional categories from the data collected. The important elements Prizant used to determine the function of each echolalic utterance were: attention as determined by eye gaze and body orientation; comprehension as indicated by a behavioral change; direction of the echoic utterance at the adult or an object; degree of change of the echo; whether the echo occurred in conjunction with a nonverbal action; and whether a response was expected from the adult. Prizant concluded that echolalia is used by some echolalic children as a comprehension device, and as a means of communicating basic intentions. This view that echolalia serves a communicative purpose can be related to similar statements that have been made about the role that imitation plays in the communicative development of some normal children (Bloom, Rocissano and Hood, 1976; Rees, 1975; Folger and Chapman, 1978).

Many of the precursors to language acquisition, such as the knowledge of relational concepts and the capacity to recognize functional linguistic relationships are not evident in emotionally disturbed children (Baltaxe and Simmons, 1975). Emotionally disturbed children do, however, have the capacity for reference (labeling). Baltaxe and Simmons (1975) hypothesize that emotionally disturbed children use the labeling function in their efforts to communicate. An echolalic child labels an event with an echolalic pattern which had been previously heard in a similar situation. The entire pattern is stored and reused. Baltaxe and Simmons propose that the echolalic child does not understand the semantic-syntactic relationships within an utterance, and therefore is unable to break down the utterance into its individual constituents. This inability to analyze patterns into their basic components may also prevent the echolalic child from generating novel utterances, and result in the development of stereotypic verbal and nonverbal behaviors.

A number of studies have suggested that echolalia may play a role in language acquisition. It has been commonly observed that the proportion of echolalic speech decreases as a child acquires a greater amount of spontaneous language (Prizant, 1978). The phenomenon of mitigated echolalia, in which a portion of an utterance is echoed, has been thought by some to indicate that true language is present (Fay and Schuler, 1980). Schuler has stated that such deviance from an exact utterance model, "may be a positive indication of cognitive linguistic abilities" (1979, p. 427). Prizant has stated that the degree to which an original utterance is modified is indicative of "linguistic and conceptual understanding of the original utterance and the context in which it is spoken" (1978, p. 159). Exact echoes may indicate that the child comprehends very little about the intentionality of the utterance. Mitigated echolalia indicates a higher level of processing in that the child is able to select which parts of the original utterance he wants to communicate.

Prizant (1978) has devised a theoretical four-stage developmental model of echolalia. The earlier stages describe echolalia that is automatic and produced with little cognitive/linguistic processing. As the echolalic child approaches stage four, he develops strategies to process information

and uses echolalia to perform a greater range of functions. The child may also acquire strategies to break down his echolalic utterances into utterances of two and three constituents. Prizant states that this developmental process, which diametrically opposes normal language acquisition, "may represent a child's increasing ability to understand the constituent structure of the utterances in terms of the relationships that he has already observed in his environment" (1978, p. 167).

It has been suggested in the literature on echolalia that emotionally disturbed children employ different language acquisition strategies than normal children. However, there are no studies which document the strategies used by echolalic children to acquire functional linguistic structures. In the past, many intervention programs have sought to extinguish echolalia (Fay and Schuler, 1980). It has been recently suggested (Prizant and Duchan, 1981) that echolalia can be utilized to enable the emotionally disturbed child to develop more effective communication skills. Baltaxe and Simmons (1975) have suggested that there may be an intervention process whereby echolalic responses can be broken down and thereby foster acquisition of more appropriate linguistic structures.

The present study was developed to investigate the echolalic behavior of an emotionally disturbed child longitudinally. This investigation sought to answer several questions which have been posed in the literature. One purpose of this study was to investigate the acquisition of a particular semantic-syntactic action relation (subject-verb-object) in an echolalic child. The authors were interested in determining if this child demonstrated selectivity with respect to various linguistic forms which represent an S-V-O relation (S-V, V-O, S-O). Longitudinal observation allowed the authors to determine if the subject utilized specific strategies in echoing. An additional purpose was to determine if the subject rigidly echoed, or if he would demonstrate the ability to break down model utterances and recombine their constituents, thereby generating novel utterances.

A third purpose of this study was to determine what functions were expressed by the echolalia. The investigators were specifically interested in determining if any of the echolalic functions described by Prizant (1978) were served by the echolalic child in this study. In regard to investigating the acquisition of a particular linguistic form, the investigators sought to determine in what functions was the form learned. A longitudinal investigation allowed the investigators to monitor any change in echolalic behavior that would indicate processing strategies and linguistic growth.

Method

Subject

The subject, A., is a 10.6 year old language-impaired male. With the exception of language and communication, developmental milestones were attained within normal limits. A. exhibits behaviors associated with the emotionally disturbed population (Baltaxe and Simmons, 1975). Such behaviors

include motoric self-stimulation (flapping arms, waving fingers in front of his eyes, and jumping up and down during periods of excitement), immediate echolalia, poor eye contact, and a tendency to shift intonation patterns according to the speaker he is echoing.

An audiological evaluation (May, 1980) determined that A.'s hearing sensitivity is within the normal range. A. currently attends a class for language impaired children in the public schools. A.'s behavior within the classroom and home settings is reportedly consistent with that displayed in therapy.

A. was initially interviewed at the Queens College Speech and Hearing Center in May, 1977 and has been receiving therapy at this facility since July, 1978. Goals have included establishment of appropriate toy play and the ability to maintain play interactions, and to increase the appropriate use of gestures or words to obtain adult attention and initiate interaction. Specific language goals have included training of two to three word semantic-syntactic relations such as existence, nonexistence, action, rejection, locative state, locative action, and recurrence. Trained utterances have expressed request, protest, and comment functions of language.

In general, A.'s language behavior is stereotypic and highly ritualized. The predominant pattern of A.'s language is immediate echolalia, in which utterances just spoken by another person are repeated. The immediate echolalia may be appropriate to the context, and is often used with intent. For example, A. may echo the utterance "stop screaming" during a tantrum in an effort to control his own behavior. A small portion of A.'s language is appropriate (meaningful to context) spontaneous language. These utterances are primarily one-word labels. Additionally, A. uses certain stereotypic fixed forms heard in previous situations that are somewhat similar to the present context (delayed echolalia). All requests for objects and actions are preceded by "gimme" or "I want the...". The form "no thanks" functions as a protest and has been highly resistant to intervention. These verbal routines are used in a variety of situations to meet specific needs. (e.g., "I want.... bathroom, school bus, the clay, hammer nails").

A. is able to follow simple one-step directions (e.g., "gimme the clay", "close the door"). Expression of affirmation (yes) occurs primarily through echolalia. In response to a question, A. will often repeat the utterances (characterized by louder voice and higher pitch) and follow it with a loudly voiced "yes". Nonverbal cues from A.'s subsequent action often aid the clinician in making a judgement about A.'s comprehension of others' utterances and the intentionality of his response.

A. typically does not initiate interactions (verbal or nonverbal) with adults. He positively responds to physical interactions initiated by familiar adults, such as tickling. When demands for actions or verbalizations are placed upon him, A. often closes his eyes. He will often scream and pinch others during periods of frustration.

When presented with objects, A. performs routinized action schemes on them, such as tapping them on his teeth and on the table. When nonverbal prompts are supplied (e.g., pointing to the object or guiding his hand), A. will appropriately imitate the clinician's actions on objects. A. does not spontaneously initiate nonverbal interactions; he does not point to, show, or give objects. In summary, object manipulation is characterized as inappropriate, and language is highly stereotypic.

Apparatus

The study was conducted in a 10' x 12' room at the Queens College Speech and Hearing Center. The experimenter and subject sat facing each other at a table. A second experimenter was present to record nonlinguistic data, and was seated at the table on the subject's right side. The second experimenter administered primary reinforcement and secondary reinforcement to the subject and kept the subject's attention focused on the stimulus materials through nonverbal means (e.g., pointing, tapping the subject's arm). A Panasonic model 1701 portable cassette tape recorder was used to tape all of the subject's verbal responses.

Stimulus materials consisted of a pool of 41 toys. These were selected on the basis of subject interest, which was indicated by the subject's sustained active manipulations of the toys and attention to others' actions on objects. Toys utilized throughout the course of the study can be found in Table 1.

Table 1. Summary of Contexts and Objects

Context	Verbs		Objects			
	Action	Locative Action	Sessions: 1-5	6-10	11-15	16-20
1.	get		ball	frisbee	car	food
2.	do		orange	bubbles	stamps	picture
3.	make		sandwich	house	pudding	jello
4.	eat		cookie	pretzel	cake	apple
5.	play		sticks	bean bag	bowling	baseball
6.		put	money	water	paint	piece
7.		take	candy	juice	potato chip	popcorn
8.		turn	music box	handle	clock	merry go round
9.		dump	garbage	sand	legos	water
10.		fit	puzzle	cups	blocks	beads
*11.	draw		circle	circle	mickey mouse	mickey mouse
*12.		away	blocks	blocks	beads	beads

*Contexts presented only if nonverbal actions were not imitated in previous contexts.

Reinforcement involved a token-exchange system. Primary reinforcers (raisins) were used to reinforce the subject's nonverbal actions on objects. A token was given to the subject at the completion of each toy context, contingent upon manipulation of the stimulus materials. Once three tokens were earned they were exchanged for a three-minute music period. These reinforcers had been consistently effective with this child in previous therapy sessions. Verbal imitations were not elicited, prompted or reinforced in any manner throughout the study.

Procedure

Preliminary Observations. Prior to the initiation of the observational study, the subject and experimenter participated in a variety of play interactions. The play contexts were designed so that the semantic-syntactic relations observed in the study could occur in the nonlinguistic context. Over the course of the five play contexts, the experimenter varied her nonlinguistic and linguistic input. The experimenter alternately initiated play with objects, or presented objects without initiating actions on them. The subject's initiation and maintenance of play interactions was observed. The experimenter's linguistic input varied within and across the five sessions. The experimenter either produced social fillers (e.g., "yeah", "oh", "wow"), two-word utterances, three-word utterances, or complex sentences. Each type of interaction style was maintained over several turns to enable the experimenters to record and examine the subject's verbal responses relative to type of linguistic input.

The five observational sessions occurred within a three-week period. A. produced over 300 utterances during this period. A small portion of those utterances were discarded because the experimenters judged them to be inappropriate to the context in which they occurred. These utterances were characterized by noises, stereotypic phrases, and verbal routines (examples of these utterances are contained within the Subject description section). Of the remaining productions, 118 utterance types were analyzed. The utterances were classified as spontaneous productions, or as immediate echolalia. Those utterances which were classified as immediate echoes were chosen based on the criteria given by Prizant (1978):

> The child's echoic response must have occurred subsequent to the interlocuter's utterance, and must have consisted of segmental and/or suprasegmental similarities to the utterance of the previous speaker, involving either rigid echoing of the model utterance (pure echolalia) or selective repetition of elements occurring (p. 66).

The 118 utterance types were analyzed as to their mean length of utterance (MLU) and the number of words per echo (WPE). Immediate echoic utterances composed .63 of the sample. The remaining .37 of the utterances were used spontaneously. Computed MLU's for the echolalic and spontaneous productions were 2.13 and 1.59 respectively.

The spontaneous productions were primarily one-word labels. Occasionally, two-word phrases occurred. These were primarily of the utterance type "gimme + noun", a form that had been previously trained in therapy to

use as a means for requesting objects and/or actions. The MLU of the echolalic utterances was considerably higher than that of the spontaneous productions. The echolalic responses were primarily two- and three-word productions, in which agent, action and object constituents were coded. Additionally, morphological markers such as the possessive -s and the present progressive tense marker -ing were coded in the echolalic utterances. These markers were absent in the spontaneous productions.

As previously mentioned, the experimenter modeled a variety of semantic-syntactic relations during the play interactions. The semantic-syntactic relations which were the focus of the study (agent-action-object, agent-action, action-object, and agent-object) were not used productively by the subject in the play interactions as evidenced by his spontaneous productions. Therefore, it was concluded that these relations were not within the subject's spontaneous language repertoire.

Longitudinal Observations. Twenty one-hour observation sessions were conducted over a three-month period. An average of two sessions were conducted per week. The objects used in the study were systematically varied to deter the subject from developing "routinized" verbal and nonverbal responses. One set of ten toys was presented during each of the first five sessions. A new set of ten toys was then presented every fifth session. For descriptive purposes, the experimenters divided the twenty sessions into four groups (of five sessions each) and used the term "phase" to refer to each group of sessions. For example, phase 1 includes sessions one through five. The same set of objects was used during an entire phase. To summarize:

Phase 1 = Sessions 1 - 5 and object set one
Phase 11 = Sessions 6 - 10 and object set two
Phase 111 = Sessions 11- 15 and object set three
Phase 1V = Sessions 16- 20 and object set four

Ten toy contexts were presented within each session. The term "context" was used to refer to nonverbal actions and verbal utterances about one object (toy). Each context was designed to approximate a naturalistic play interaction, in which the experimenter and subject were involved in joint attention and joint activity. The experimenter acted on a toy (nonverbal input) and commented on her actions (verbal input).

The nonverbal input presented by the experimenter within one context consisted of four repeated actions on a toy. For example, the toy used in context one of session one was a ball, which was placed a short distance from the experimenter. The action produced by the experimenter was to "get" the ball. This action was repeated four times within the context. To approximate a naturalistic play context, the experimenter threw the ball into a basketball hoop after "getting" the ball. The action of retrieving or "getting" the ball was then appropriate to the context.

The experimenter's verbal input occurred simultaneously with her nonverbal actions. For example, during presentation of the aforementioned context, the experimenter acted on the ball in the defined manner and labeled her actions (e.g., "get ball"). Within one context, the experimenter's verbal input consisted of one token each of four utterance types: subject-verb-object (SVO); subject-verb (SV); verb-object (VO); and

subject-object (SO). To illustrate, each time the experimenter retrieved the ball, she produced a different utterance. These utterances were: "I get ball"; "I get"; "get ball"; "I ball". The experimenter produced the personal pronoun "I" within each utterance which contained a subject as a constituent because A. had demonstrated difficulty in using the appropriate deictic term. When the experimenter produced an SVO utterance, she said "I get ball", rather than "Theresa get ball". As a result, if A. echoed the entire utterance it would be appropriate to his action of getting the ball. The order of presentation of the four utterance types was randomized within each context over each session.

As previously mentioned, ten contexts were presented within each session. Each context illustrated one verb topic. Context one always involved the presentation of the verb topic "get". A verb topic was assigned to each context, and used within that context for the duration of the study. Twelve verb topics (six action words and six locative action words) were selected for the study, on the basis of frequency of occurrence in the speech of young children observed by Bloom, Miller and Hood (1975). Ten of the twelve verb topics were assigned to the ten contexts that were presented within each session. The remaining two verb topics were used to design two supplementary contexts. These contexts were only presented if the subject failed to imitate the experimenter's nonverbal manipulation of a toy within a context. In order for a context to be included in the data analysis, the subject was required to appropriately act on an object four times. Occasionally a context had to be discarded (e.g., A. produced tantrum behavior). When this occurred, a supplementary context was presented, which allowed ten contexts per day to be available for data analysis. Refer to Table 1 for a complete listing of the verb topics and the contexts in which they were used.

At the start of each context, the experimenter determined that the subject was attending as indicated by eye gaze. For each context, identical objects were placed in front of the experimenter and the subject. The experimenter manipulated one of the objects while producing each of the four utterance types. Following the production of each utterance, the subject was allowed a twenty-second time period in which to imitate the experimenter's nonverbal actions. During the prescribed interval, the second experimenter gave A. one nonverbal prompt (pointed to the object or touched A.'s arm) if the child did not begin to manipulate the object. A. received primary reinforcement (raisins), contingent upon appropriate nonverbal object manipulation in order to maintain his interest in the task.

The following sequence was carried out within each context:

1. The context toy (e.g., a ball and a basketball hoop) was presented.

2. The experimenter retrieved the ball while simultaneously producing the verbal input (e.g., "I get ball").

3. The subject was given twenty seconds in which to imitate the nonverbal action. One nonverbal prompt was supplied by the second

experimenter if the subject did not initiate the action. A. received a raisin after he performed the action (e.g., got the ball). Any accompanying verbalization was recorded.

4. The experimenter proceeded to repeat the action, while the second target utterance was produced (e.g., "get ball"). The above procedure (step #3) was then carried out.

The remaining utterances ("I get", "I ball") were produced according to the procedure outlined above to complete one toy context. The remaining nine contexts were presented in the same manner, and in the same order for each session.

In summary, one token of each utterance type was presented within each context. Ten contexts were presented per session. Five sessions constituted a phase. Within each phase, there were 50 presentations of each utterance type. All of the subject's echolalic responses to the experimenter's verbal input were recorded, and analyzed by phase.

The second experimenter recorded the subject's nonverbal actions and verbal responses throughout the study. Refer to Appendix A for a sample data sheet and a description of the protocol used in recording the subject's verbal and nonverbal responses.

Supplementary observations. At the conclusion of the twenty observational sessions, the subject was observed in naturalistic play contexts for three one-hour sessions. Novel toy contexts were designed in which those verb topics presented in the study could be expected to occur spontaneously. The experimenter's verbal input during these sessions was similar to the types of utterances produced during the preliminary observations. That is, the experimenter's input varied from conversational fillers to complex sentences. This was conducted to determine if A.'s echolalic responses and/or spontaneous productions were qualitatively different than those which were recorded during the preliminary sessions.

During the sessions, A. produced a total of 57 different utterances which were appropriate to the context in which they occurred. Of the sample, .28 of the utterances were immediate echoes. The remaining .72 were spontaneous productions. The MLU's of the echolalic and spontaneous productions were 2.06 and 2.07, respectively.

Results

Preliminary observations. Based on the language samples collected during the preliminary observations, the experimenters concluded that the semantic-syntactic relations which were to be the focus of the study were not within the subject's spontaneous language repertoire. Of the total sample, .63 of the subject's utterances were echolalic, and the MLU of these utterances was 2.31. The remaining .37 of the sample was classified as spontaneous language. The MLU of these utterances was 1.59.

Longitudinal observations. Results of the longitudinal observations indicate that A. frequently echoed the experimenter's linguistic input. A.'s responses were either exact echoes of the model, or were modified in some manner. Modified echoic responses were defined, for the purposes of this study, as those which contained one or more elements of the linguistic model, with constituent deletions or additions.

Table 2 illustrates the proportion of exact echoic responses per phase. Interestingly, the proportion of exact echoes of SVO and SO models increased over time from phase I to phase IV.

Table 2. Proportion of Exact Echolalic Utterances

Linguistic Model	Phase I	Phase II	Phase III	Phase IV
Subject-Verb-Object	.06	.14	.10	.26
Subject-Verb	.06	.10	.20	.04
Verb-Object	.38	.44	.24	.32
Subject-Object	.22	.46	.32	.44

Exact echoes in response to the SVO model increased from .06 (phase I) to .26 (phase IV). Exact echoes in response to the SO model increased from .22 (phase I) to .44 (phase IV). There was essentially no change in the proportion of exact echoic responses to the linguistic stimuli SV and VO across phases.

Analysis of A.'s modified echolalic responses yields some interesting results. Table 3 illustrates the most frequent response to specific linguistic input per session. Inspection of this table reveals that A. selectively chose which linguistic form he echoed. Responses of the form VO were overwhelmingly used when the experimenter modeled the VO form. Therefore, A. infrequently modified a VO stimulus when producing his response. However, when the SVO and SV forms were modeled, A. most frequently modified these forms and produced a VO response. This pattern was present during phases I through III, but was modified at phase IV.

Table 3. Most Frequently Echoed Responses To Specific Linguistic Input

Sessions	Linguistic Model			
	Subject-Verb-Object	Subject-Verb	Verb-Object	Subject-Object
1	VO	V	VO	O
2	VO	*	VO	O
3	VO	SV	VO	SO
4	VO	*	VO	SO
5	VO	VO	VO	SO
6	VO	*	VO	SO
7	VO	*	VO	SO
8	SVO	*	VO	SO
9	O	*	VO	SO
10	VO	VO	*	SO
11	VO	SV	VO	SO
12	SVO	SV	VO	SO
13	VO	VO	*	*
14	*	VO	VO	SO
15	SVO	VO	VO	SO
16	*	*	VO	SO
17	SVO	SVO	VO	SO
18	SVO	*	VO	SO
19	SVO	SVO	VO	SO
20	SVO	VO	VO	SO

*Two or more forms were echoed with the same frequency.

During phase IV sessions, a simultaneous increase in SVO responses and decrease in VO responses was noted. The most frequent response to SVO and SV stimuli during phase IV was SVO.

These patterns indicate a need to more closely inspect A.'s modified echolalia. Table 4 lists A.'s most frequently used modified echo in response to specific linguistic input.

Table 4. Most Frequent Response Form In Modified Echolalia.*

Linguistic Model	Phase I	Phase II	Phase III	Phase IV
Subject-Verb-Object	VO (13)	VO (12)	VO (7)	VO (4)
Subject-Verb	VO (6)	VO (9)	VO (6)	SVO (6)
Verb-Object	--	--	SVO (2)	SVO (3)
Subject-Object	VO (1)	--	VO (1)	--

* - frequency of occurrence in brackets

The VO form was overall the most commonly used form as a modification for all

other linguistic models (SVO, SV and SO) in phases I and II. In phases III and IV, the SVO form was produced at a higher frequency than in the earlier phases, and was the most frequently used variation for the SV model in phase III and the VO model in phases II and IV. This indicates that, towards the end of the study, A. began to use the more linguistically complex form as an exact echo as well as in other linguistic contexts.

Overall, the VO form was used most frequently as a response in the presence of other linquistic contexts. The VO form was infrequently modified, and when it was modified, it was replaced only by the SVO form, and only in phases III and IV.

As is illustrated in Table 4, VO responses occurred at a constant frequency over time in the presence of SV and SO models. Change in the frequency of modified echolalia is seen in the presence of SVO and VO models. An inverse relationship is observed, as SVO modifications decrease simultaneous with an increase in VO modifications.

The frequency of occurrence of exact and modified echolalic responses in the presence of the four types of linguistic stimuli is illustrated in Table 5. Responses to the SV, VO and SO models underwent little change across the phases.

Table 5. Comparison of Frequency of Exact Echolalia and Modified Echolalia

Linguistic Model	Exact Echolalia				Modified Echolalia			
Phases	I	II	III	IV	I	II	III	IV
Subject-Verb-Object	3	7	5	13	21	19	10	9
Subject-Verb	3	5	10	2	14	16	9	17
Verb-Object	19	22	19	16	5	4	6	7
Subject-Object	11	23	16	22	8	4	4	5

The frequency of the exact and modified echolalic responses remained rather stable throughout the observation sessions. However, the responses to the SVO model are notable and of particular interest. The frequency of exact echoic responses to SVO stimuli increased across the four phases (3 in phase I to 13 in phase IV). Simultaneous with this change is a decrease in the modified responses to the SVO stimuli across phases (from 21 in phase I to 9 in phase IV).

The general pattern that has emerged is that at the start of the study, A. exhibited a tendency to produce modified echolalia in response to three of the four types of linguistic models. Over time, A.'s alterations of the linguistic model decreased and he more consistently produced a more linguistically complex utterance.

Along with analyzing the form of A.'s echolalic responses, the functions of responses were analyzed with regard to A.'s nonverbal behaviors at the time of the response based on characteristics described by Prizant (1978). The nonverbal components used to ascribe a function for the purposes of this

study were: the subject's nonverbal action on the context toy: the latency between the subject's nonverbal action and his verbal response; and the subject's eye gaze at the time of his utterance.

Table 6 illustrates the timing of A.'s utterances across phases in relation to: the experimenter's verbal and nonverbal input; and to A.'s action on an object. The table lists the proportion of utterances which occurred within a specific time frame.

Table 6. Proportion of Utterances Which Occurred Within A Specific Time Period

Time Period	Phase I	Phase II	Phase III	Phase IV
AB	.03	.10	.16	.15
BC	.53	.75	.59	.28
CD	.01	.10	.21	.49
DE	.43	.05	.04	.08

Key: AB - during Experimenter's action and utterance
BC - after Experimenter's utterance
CD - during A.'s action
DE - after A.'s action

Responses which occurred during time period AB (before or during the experimenter's verbal and nonverbal models), increased from .03 in phase I to .15 in phase IV. A greater increase in the proportion of responses is noted within time period CD, (during A.'s action), from .01 in phase I to .49 in phase 4. Simultaneous with these increases across phases is a decrease in the proportion of utterances which occurred during time periods BC and DE (from .53 to .28 and from .43 to .08, respectively). This data indicates that A.'s echolalic response and his nonverbal action on an object more closely approximated each other in time across the phases.

As previously noted, analysis of the form of A.'s responses indicated that specific changes occurred over time regarding the VO and SVO responses. Based on this pattern, the functions of these two linguistic response forms were analyzed. Results of this analysis are illustrated in Table 7.

Table 7. Proportion of V-O and S-V-O Responses Which Occurred Within A Specific Time Period In Each Phase

Time Period	V-O Responses				S-V-O Responses			
	Phases I	II	III	IV	Phases I	II	III	IV
AB	--	--	.07	.04	.25	--	.11	.08
BC	.46	.88	.70	.28	.25	.86	.22	.13
CD	.12	.12	.20	.61	--	.14	.45	.47
DE	.42	--	.03	.07	.50	--	.22	.32

The majority of A.'s responses during phases I and II occurred within the BC time period. Utterances of this type are similar to the turn taking echoes described by Prizant (1978). These echoes are thought to function as a "device for social closure" (p. 105), in that they enable the child to maintain a social interaction. The utterances which occurred during phases I and II were ascribed to the turn taking category based on A.'s gaze, which was directed towards the examiner, and response latency, which was of extremely short duration.

For both the SVO and VO forms, similar transitional patterns emerge, in that, by phase IV, the majority of these response types occurred during time period CD. This suggests the gradual emergence of the self regulatory function (Prizant, 1978) as evidenced by: A.'s gaze, which was directed at the object or the examiner, and the use of modified echolalia. Self regulatory echoes "help a child direct his own behavior during and due to the production of the utterance" (p. 108).

It should be noted that the progression towards the self-regulatory function occurred simultaneously with the increase in exact echoic responses to SVO models. A.'s eye gaze at the time of his utterance was recorded to determine if it was directed at the object of his action, at the examiner, or at some point away from the context. A.'s object gaze at the time of his utterance increased from .09 at phase I to .25 at phase IV. This increase in object gaze indicates that A. evidenced greater comprehension and shared joint attention and joint activity with the experimenter at phase IV.

Along with specific echolalic responses to the experimenter's linguistic models, A. also produced some utterances spontaneously throughout the course of the study. These utterances occurred either at the start of an action event (i.e., before the experimenter modelled any nonverbal or verbal input) or at the end of an action event. There was a general increase in the number of these spontaneous productions from phase I to phase IV. All of the utterances were appropriate to the context in which they occurred. The majority of the utterances were of the VO form. This is an interesting observation as the utterances which were collected during the preliminary observations were primarily one-word labels, and few instances of VO utterances occurred.

Supplementary observation. A total of 57 utterances were collected during these observations. Of this sample, .72 of the utterances were produced spontaneously. The remaining .28 was classified as immediate echolalia. The computed MLU's for the spontaneous and echolalic utterances were very similar, 2.07 and 2.06, respectively. The MLU of the utterances which were produced spontaneously increased from 1.59 to 2.07. Quantitatively, the proportion of the spontaneous utterances increased from .37 to .72. A slight decrease in the MLU of the echolalic language occurred; from 2.31 to 2.06. This may be due to the restricted linguistic input that A. was exposed to during the longitudinal observations.

Discussion

This study addressed a variety of issues regarding the selectivity of immediate echolalia and the functions served. The results of the longitudinal investigation demonstrated that the subject selectively echoed particular linguistic forms. Specifically, the VO form was highly preferred for the duration of the study. This pattern was present over the twenty sessions, and was not felt to be a function of specific context. This suggests that, for the subject, echolalia was highly selective behavior. This finding is supported by Baltaxe and Simmons (1975), who suggest that an echolalic child differentiates among types of linguistic input and "may not be echolalic with respect to all the utterances he hears" (p. 444). These statements suggest evidence of comprehension on the part of the echolalic child. With respect to the present investigation, the experimenters postulate that A. preferred the VO form because he understood the relationships between the constituents best in that linguistic context.

A change in form preference was also observed. Complete repetition of the SVO form began to emerge at the end of the study. Additionally, the SVO form became the most frequent response to the SV form. This is interesting, as it indicates that the subject utilized echolalia to expand his utterances. Perhaps the SVO form became more salient to A., due to his increasing recognition of the relationship between his utterance and the nonlinguistic context.

Echolalic children have been thought to echo whole chunks of utterances before they can manipulate the individual constituents spontaneously. Evidence reported here suggests that the subject did not utilize this strategy. Rather, A. chose to echo two-constituent utterances before expanding his linguistic repertoire to include three-constituent utterances.

Additionally, functional categories ascribed to A.'s utterances appeared to change over time. A.'s eye gaze became differentiated with an increase in attention to objects. Response latency increased, as A.'s utterances occurred more closely in time with his object manipulations. This study was not designed to teach functions of language, but rather to investigate how echolalia functioned for a particular child. Perhaps the functions served by the echolalia underwent changes due to the contextual constraints of the observational study. Within the contexts, there was a strong relationship between the nonlinguistic and linguistic stimuli. The pairing of an action event with an appropriate linguistic structure facilitated learning, and therefore a change in the functions of this child's echolalia was observed.

Through the use of highly structured, though naturalistic contexts, the experimenters observed a change in linguistic structure and function over time. Based on the analysis of data collected in the preliminary observations, the experimenters chose to present a linguistic rule they hypothesized the subject needed to learn. The form or the underlying concepts of these action relations were salient to the subject and may have facilitated acquisition. If other semantic relations had been chosen, similar results may not have been evident.

The experimenters observed a language acquisition process similar to that described by Prizant (1978). The subject was observed to acquire and apply specific strategies to break down echolalic utterances. Prizant has proposed that these strategies "may represent a child's increasing ability to understand the constituent structure of the utterances in terms of relationships that he has already observed in his environment" (p. 167). The subject produced a large quantity of modified echolalia, and demonstrated the ability to recombine segments of echolalic utterances, as well as an ability to generate spontaneous utterances.

Within this study, the authors have demonstrated that training in highly structured, naturalistic contexts, in which pragmatic and linguistic concerns are accounted for, can facilitate language acquisition and spontaneous usage in an echolalic child. Other studies have utilized echolalia in structured contexts to train linguistic forms and functions of language. Through the use of elicited imitation, Baldo, Wollner and Geller (1978) taught an echolalic child action and locative action relations which expressed the comment and request functions of language. Marks, Fellows and Kuprus (1981) reported that the use of role play contexts facilitated linguistic growth in an echolalic child.

Clinicians working with echolalic children should investigate a child's linguistic and pragmatic skills to determine how echolalia functions for that particular child. Echolalia should not be extinguished, but rather, it can be utilized to design communicative contexts to aid in language acquisition. Over time, a clinician can observe the change in the functions served by echolalia and modify teaching contexts accordingly.

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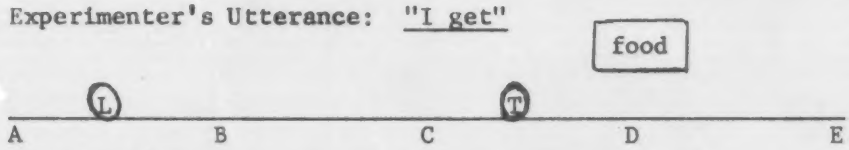
Appendix A

Sample Data Sheet and Protocol

Experimenter's Utterance: "I get"



A.'s Utterance: "get food"

Action: (±) : +

The experimenter's utterance is written near the top of the box. The relationship between the experimenter's verbal production and the subject's nonverbal and verbal behavior is illustrated on the continuous line. The description of the points on the continuous line is as follows: AB = during Experimenter's utterance; BC = after Experimenter's utterance; CD = during A.'s action; and DE = after A.'s action. The circled L on the line indicates that A.'s gaze was directed toward the experimenter while she produced the model utterance "I get". The circled T indicates that A. produced his verbal response "get food" while he was acting on the object. The box in the upper right indicates that A.'s gaze was directed towards the food while he was producing his verbal response. The plus sign indicates that A. performed the required action. The data illustrated here was recorded for every action event modelled by the experimenter.

Speech Act Production of Adult Aphasics

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Abstract

The ability of adult aphasics to convey a variety of communicative intentions was investigated. Three structured naturalistic contexts designed to elicit ten speech acts were presented to four non-brain-injured and to four aphasic subjects (two fluent; two non-fluent). Comparisons were made between aphasic and control subjects' speech act production. Results indicated that regardless of type of aphasia, the aphasics' ability to convey communicative intentions was similar to that of the normal subjects. Implications for pragmatically oriented aphasia therapy are discussed.

Much of the research in the area of aphasia has focused primarily on the linguistic aspects of aphasic language production. Researchers have described aphasics' language in terms of specific areas of linguistic deficit such as: articulation, fluency, word-finding, repetition, seriatim speech, grammar, paraphasia, auditory comprehension, reading and writing (Goodglass and Kaplan, 1972; Schuell, 1975). Therapy based on this type of description has focused on remediation of the various linguistic deficits.

Recently, aphasia research has begun to consider pragmatic abilities of aphasic adults. Bates (1976) defines pragmatics as "rules governing the use of language in context". A crucial aspect of the use of language or pragmatics concerns the "speech act". The theory of speech acts was devised by Austin (1962) and elaborated on by Searle (1969). This theory proposes that all speech acts have two basic elements: 1) a propositional meaning termed the locutionary force of an utterance, and 2) an intention that the speaker wishes to communicate referred to as the illocutionary force.

According to Dore (1975), the same utterance may be used to convey different intentions. For example, the utterance "It's warm in here" may function as a description in one context and as a request for action (e.g., to open a window) in another. On the other hand, different utterances may convey the same intentions. For example, "I'd like some coffee" and "That coffee looks good" could both function as a request for a drink. The linguistic aspects of an utterance (i.e., syntactic, semantic, and phonological) do not necessarily provide all the information needed to determine the communicative intention of the speaker. Thus, a language analysis done within a pragmatic framework takes into account non-linguistic

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aspects of the communicative situation as well as linguistic aspects in order to determine a speaker's communicative intention.

Studies of illocutionary acts produced by young, normal children have provided valuable descriptive information. In an investigation of seven three-year old normal children, Dore (1976, 1978) identified six categories of illocutionary acts. These included: Requestives, Assertives, Performatives, Responsives, Regulatives, and Expressives. Each category was further divided into several types of acts. For example, Requestives included: Wh questions, Action Requests, Choice Questions, Process Questions, Permission Requests, and Suggestions.

A few recent investigations in the field of aphasia have focused on the pragmatic abilities of adult aphasics. Wilcox and Davis (1978) looked at the ability of aphasics to comprehend indirect requests within a "naturalistic setting" (i.e., viewing videotapes depicting naturalistic situations). Eighteen aphasic adults were presented with videotapes of familiar situations involving two adults in which one adult made an indirect request and the other adult responded either appropriately or inappropriately. The aphasic clients had to judge whether the response to the request was appropriate or not. Wilcox and Davis found that the aphasics' performance with indirect requests was superior to their performance on a standardized battery of auditory comprehension tasks. Thus, they concluded that aphasics' performance in this area of pragmatic ability, the ability to comprehend indirect requests, would be better reflected in a naturalistic context.

Holland (1975) similarly reported that based upon informal observations, aphasics appeared to demonstrate pragmatic skills which were superior to their linguistic skills. She observed that in spite of severe limitations in the expression of propositional content, aphasic individuals were capable of communicating a variety of intentions within relatively naturalistic settings.

Wilcox and Davis (1977) examined the range of speech acts produced by adult aphasics with different types of aphasia in two settings: 1) individual therapy, and 2) an informal group setting. Their results, contrary to Holland's, indicated that aphasics' general range of speech act usage was limited regardless of type of aphasia or setting. However, it was postulated that this apparent deficit was observed due to the clinicians' general patterns of speech act usage. Wilcox and Davis suggest that the clinicians' disproportionate use of questions restricted the aphasics' opportunities to express a variety of communicative intentions. Specifically, the aphasics' expression of speech acts was limited primarily to assertions produced in response to questions.

Prinz (1980) investigated requesting strategies utilized by three types of aphasics (i.e., Broca's, Wernicke's, and Global). His results indicated that aphasics are generally able to convey requests by employing both verbal and non-verbal strategies regardless of etiology or degree of linguistic impairmant.

In terms of the evaluation of the aphasic's language abilities, many assessment devices have utilitzed a linguistic approach. For example, The Boston Diagnostic Aphasia Examination (1972)consists of 25 subtests which examine the subjects' word-finding ability, repetitions, and paraphasias among other possible areas of linguistic deficit. Scores are obtained and an aphasia classification profile is developed. The subjects' performance is then compared to norms obtained from other subjects exhibiting various classifications of aphasia.

On the Porch Index of Communicative Ability, (PICA),mean scores are obtained based on the aphasics' verbal, gestural, and graphic performances. Scores received in these areas are then used in planning treatment and predicting future change.

Two assessment procedures have attempted to assess the aphasic's overall communicative functioning. The Functional Communication Profile (FCP), (1965) examines forty-five communication behaviors in an informal setting and assigns the subject a score based on a nine point scale. Holland, (1980) has devised a diagnostic test (the C.A.D.L.-Communicative Abilities in Daily Living) which is designed to provide a profile of aphasic's pragmatic abilities. This assessment device provides information concerning aphasics' speech act production. Subjects are engaged primarily in role-playing situations and the following speech acts are elicited: correct, inform, explain, request, request clarification, negotiate, advise/warn, report. Social conventions are also investigated.

An example of role-playing situation used in the C.A.D.L. involves the subject being told to pretend that he is shopping in a store. The examiner says, "You need shoelaces. You can't find them. A clerk says, 'May I help you?". What do you say?". The examiner is interested in eliciting a request for information from the patient. In another example, the speech act report is elicited. The examiner asks, "How would you let somebody know that you're too cold?". In a third context which does not involve role-playing, the examiner's jacket is situated so that the patient can see it but the examiner cannot. The examiner asks the subject, "Do you know what I did with my jacket?". Here a Description of Location is expected. It is important to note that although the C.A.D.L. examines a range of speech acts, the majority of them are within a responsive mode.

In order to evaluate pragmatic abilities, it appears that a more naturalistic approach is needed as an alternative to structured and/or formal aphasia testing. A similar view was expressed in terms of evaluating language disordered children in a recent study by Majlinger, Modugno, Wollner and Longtin (1981). In this study, 18 contexts were designed to elicit several trials of 10 speech acts or communicative intentions. Comparisons were made between language disordered and normal children's language with respect to their ability to express the communicative intentions. The authors suggest that their contexts be used as an alternative to or in addition to formal testing and language sampling procedures. The trend toward developing alternatives to formal testing now being considered in the area of child language may provide guidelines for similar considerations in the area of adult aphasia.

The present study was designed to investigate the pragmatic abilities of adult aphasics by examining their use of self-initiated as well as responsive speech acts within structured naturalistic contexts.

The purposes of this study include the following:

1) To develop a battery of naturalistic contexts designed to elicit specific speech acts based on the performance of non-brain-injured adults;

2) To determine whether adult aphasics show a distinctive impairment in speech act production when compared to non-brain-injured adults within naturalistic contexts;

(a) Do the aphasics use the speech acts expected (based on normal's performance) in specific naturalistic contexts;

(b) Do the aphasics express the same range of communicative intentions as the non-brain-injured adults;

(c) If the aphasics' linguistic abilities are impaired, do they express communicative intentions through non-verbal means;

3) To discover whether a relationship exists between type of aphasia and specific pragmatic deficits;

4) To discuss implications for aphasia therapy.

Method

Subjects:

Eight institutionalized adult males who were residents of the St. Albans Veterans Administration Extended Care Facility were chosen as subjects for the study. Data describing all subjects is contained in Table 1. Criteria for subject selection included: 1) a minimum age of 40 years; 2) a minimum period of institutionalization of six months; 3) completion of at least an elementary school education, and 4) English as the native language. All subjects received a routine speech/language evaluation performed by an experienced speech/language pathologist upon admittance to the institution. Subjects were divided into two groups. Group 1 consisted of four aphasics and Group 2 consisted of four non-brain-injured subjects.

Group 1 - Aphasics. Judgements concerning classifications of aphasia were made by an experienced speech/language pathologist. Aphasia resulted from cerebrovascular accidents in all cases. All of the aphasics exhibited damage of the left hemisphere as evidenced by right-sided motor involvement or sensory deficit or both. The time elapsed since onset of aphasia ranged from 8 to 54 months for all aphasic patients. Their ages ranged from 62 to 65 years. Educational level ranged from 8 to 12 years of schooling and period of institutionalization ranged from 7 to 54 months.

Subjects whose Porch Index of Communicative Ability score profile was indicative of aphasia and who scored below the 65th percentile on the PICA were classified as aphasics. All PICA tests were administered and scored by an independent speech/language pathologist experienced with PICA scoring.

Table 1. Subjects' Descriptive Data

	Subjects	Age in Years	Years of Education	Months of Institution-alization	Months Post-Onset of Aphasia	PICA Overall
Group 1:	Aphasics					
Non-Fluent	1	65	8	54	54	48
	2	62	12	36	37	43
Fluent	3	63	11	7	8	64
	4	64	12	8	16	49
		$\bar{X}$ = 64 range= 62-65 yrs.	$\bar{X}$ = 11 range= 8-12 yrs.	$\bar{X}$ = 26 range= 7-54 mos.	$\bar{X}$ = 29 range= 7-54 mos.	$\bar{X}$ = 51% range= 43-64%
Group 2:	Controls					
	1	54	14	18		
	2	55	10	60		
	3	67	12	24		
	4	42	13	35		
		$\bar{X}$ = 55 range= 42-67 yrs.	$\bar{X}$ = 12 range= 10-14 yrs.	$\bar{X}$ = 34 range= 18-60 mos.		

The general distribution of overall PICA scores of the aphasic subjects resemble the scores obtained by a random sample of 150 aphasic subjects examined by Porch (1967). Thus, the performance of the aphasic subjects in the present study may be considered to reflect the norms of the general aphasic population.

All subjects were enrolled in language intervention programs at the St. Albans Veterans Administration, Extended Care Facility. Four male aphasics were selected. The language characteristics of these subjects corresponded to two types of aphasia: two subjects (i.e., subjects #1 and #2) were considered non-fluent (Broca's) and two subjects (i.e., subjects #3 and #4) were considered fluent (Wernicke's). The non-fluent aphasic subjects demonstrated slow, laborious and telegraphic speech (i.e., function words were omitted). Also, literal paraphasias were common and phrases were rarely longer than 2-3 words (e.g., "Oh boy", "I go", "It's a doughnut"). The fluent aphasic subjects exhibited fluent speech characterized by various paraphasias (i.e., verbal and literal). Neologistic jargon was sometimes noted. Average phrase length was approximately 5-6 words and rate of speech greater than normal, (e.g., "She works, she is going to work for the makeup". "She is going to be the pill girl". "The white underment in the inside").

Group 2 - Controls. Four male subjects who demonstrated no evidence or history of neurological damage served as controls. All subjects were free of any communication disorder as judged by an independent speech/language pathologist. The ages of non-brain-injured subjects ranged from 42 to 67 years. Educational level ranged from 10 to 14 years of schooling and their period of institutionalization ranged from 18 to 60 months. Subjects were selected randomly from the non-brain-injured resident population of the St. Albans Veterans Administration, Extended Care Facility.

Apparatus:

Experimental sessions were conducted in a 9' by 7' room at the St. Albans Veterans Administration, Extended Care Facility. A variety of personal, household, and food items were selected for the three contexts (i.e., Context 1, Coffee, Context 2, Photo, Context 3, Daily Living). A description of these contexts and the materials used for each context can be found in Appendix A.

The subject and the experimenter sat facing each other. Verbal and non-verbal data were collected by a second experimenter. All sessions were audio taped with a Lloyd's model #V122 and a Panasonic Model #RQ335A cassette recorder to facilitate later independent transcription.

Procedure:

Three naturalistic contexts (Coffee, Photo, Daily Living) were devised to elicit a range of speech acts. (Definition of these speech acts can be found in Appendix B). Each context was designed to elicit two instances of ten speech acts. Thus, there was a total of 6 opportunities for the use of each of the 10 speech acts. The contexts were presented in the same order to all subjects during a single 45 minute session per subject. Each context lasted approximately 15 minutes. The same experimenter presented all contexts to all subjects. A second experimenter recorded all verbal and non-verbal data. The presenting experimenter followed a prepared script containing verbal and non-verbal behaviors which were employed

to elicit verbal and non-verbal communicative acts. A verbal communicative act was defined as any linguistic utterance which conveyed an intention (See Appendix B). A non-verbal communicative act referred to any recognizable gesture which conveyed an intention. (Adapted from Wollner and Geller, 1980). The experimenter adhered to the prepared script unless the necessity to maintain conversational flow dictated otherwise.

All three contexts were first presented to two non-brain-injured subjects in order to determine whether the contexts were appropriate for eliciting the expected speech acts. These initial sessions indicated that all contexts accomplished their intended objective, i.e., elicited the use of the expected speech acts. The contexts were then presented to the two remaining non-brain-injured subjects and the four aphasic subjects.

Both self-initiated and responsive speech acts were elicited by the experimental contexts. Self-initiated acts were those which were not produced in response to a Wh-question or a direct request. Verbal statements and/or non-verbal behaviors were employed by the presenting experimenter to elicit these acts. Assertives, requestives, performatives, and regulatives were self-initiated acts. For example, to elicit the assertive, "description of location" in Context #3, the presenting experimenter placed a bar of soap in the subject's view but not in the experimenter's view. The verbal statement was: "I need the soap", to which the subjects responded with utterances such as "over here" or "here it is".

Responsive speech acts were those which were produced in response to a Wh-question or a direct request. Product answers and clarification responses were responsive speech acts. For example, to elicit the responsive, "product answer" in Context #1, subjects were encouraged to select a doughnut for themselves or for the experimenter. Then they were asked, "What kind of doughnut did you take?". Subjects' responses included: "Chocolate" and "a jelly one".

Certain guidelines were followed during presentation of the experimental trials. Responses to presented trials were assigned numerical scores (i.e., 0-4) based upon a rating scale adapted from Wilcox and Davis (1981). A description of this scale can be found in Appendix C. If a subject responded to the verbal statement or non-verbal behavior immediately, the response received a score of 4, the highest possible score. If the subject did not respond immediately, the presenting experimenter continued to talk about the topic. During this time, the experimenter's verbal cue was either repeated or rephrased. If a response followed, it received a score of 3. If general conversation did not elicit the expected self-initiated act, the experimenter asked a specific question. An utterance produced in response to a specific question when a self-initiated act was expected was assigned a score of 2. If the subject's response indicated that he did not completely understand the message, a score of 1 was assigned. A score of zero was assigned if the subject completely ignored the trial after the message was rephrased and a specific question was provided.

When the presenting experimenter could not present a trial due to conversational or behavioral restraints, improvisation was used and a similar trial was presented during the context as soon as possible. The subject's response to this trial was scored as the original trial would have been. If a trial was presented and the subject did not respond appropriately, the subject's response was scored accordingly even though the expected speech act might have been expressed spontaneously during conversation outside of the experimental trials.

In order to establish inter-tester reliability, all audio tapes were independently transcribed and scored by both experimenters. The experimenters later compared assigned scores. If discrepancies existed, the tape was replayed by each experimenter. Agreement concerning the assignment of rating scores was usually reached through this method. However, if agreement was not reached, the experimenters independently referred to the written data collected during the experimental sessions. Using this procedure, concurrence on the assigned score was always reached.

There were several trials which were not included in the analysis of the data. These included those few occasions when a subject produced an appropriate but non-expected speech act in response to a presented experimental trial. In addition, if the presenting experimenter failed to follow the prepared script during presentation of a trial due to an oversight, that trial was labeled a technical error and was not included in the final data analysis.

Results

The results of this study indicated that the naturalistic contexts designed could be used to elicit a range of speech acts. In other words, the experimental contexts successfully elicited the expected speech acts from non-brain-injured adults.

In comparing the performance of non-brain-injured and aphasic adults, computation of mean rating scores (see Table 2) revealed that aphasic adults did not show any impairment in speech act production when compared to normal adults within structured naturalistic settings. An identical grand mean of rating scores across all speech acts of 3.6 was obtained by Group 1 (the aphasic subjects) and by Group 2 (the non-brain-injured subjects). In other words, the aphasic subject's expression of speech acts in experimental contexts was similar to that of the non-brain-injured adult. Further, it was found that the aphasics expressed the same range of speech acts as the non-brain-injured adults.

Table 2. Means and Grand Means of Rating Scores for Aphasics and Non-brain-injured Control Subjects

Speech Act	Non-fluent Aphasics	Fluent Aphasics	All Aphasics	Controls
ASDC	3.9	3.7	3.8	3.6
ASEV	3.2	3	3.1	3.1
ASIR	3.3	3.5	3.4	3
RQAC	3.7	3.7	3.7	3.6
RQPR	3.4	3.3	3.4	3.8
PFPR	4	4	4	3.9
RSPR	3.9	3.7	3.8	3.9
RSCL	4	4	4	4
ODBM	4	4	4	4
ODCQ	3.9	3.6	3.7	3.7
Grand Means (All Acts)	3.6	3.7	3.6	3.6

Comparison of speech act use was also made between the two sub-groups in Group 1, i.e., non-fluent and fluent subjects. Performance of subjects #1 and #2 (non-fluent aphasics) was compared to that of subjects #3 and #4 (fluent aphasics). The grand mean scores across all speech acts obtained by non-fluent and fluent aphasics were 3.6 and 3.7 respectively. Thus, those scores suggest that no relationship exists between type of aphasia and speech act use.

The percentage of speech acts produced non-verbally was computed for each subject and a mean percentage was then obtained for each group (i.e., Group 1 and Group 2). These results can be found in Table 3. Analysis of these data indicated that the mean percentage of acts produced non-verbally by aphasics (6.7%) was slightly higher than the mean percentage produced by normals (2.3%). However, the overwhelming majority of speech acts were expressed verbally by both groups of subjects.

Table 3. Percent of Speech Acts Produced Non-verbally By Each Subject

Subject		Percent
Aphasics		
	1	5.4%
	2	14.3%
	3	3.6%
	4	3.6%
Controls		
	1	5.6%
	2	3.6%
	3	0 %
	4	0 %

It is interesting to note that the non-fluent aphasic subject (#2) who obtained the lowest overall PICA score expressed the highest percentage of acts non-verbally (14.3%) when compared to the normals and the other aphasic subjects.

Discussion

The present study compared adult aphasic's and non-brain-injured adult's use of self-initiated and responsive speech acts within structured naturalistic settings. Unlike previous studies (Holland, 1980; Wilcox and Davis, 1981), the contexts designed for this investigation were naturalistic and did not involve the use of role-playing. Also while the subjects' use of responsive speech acts was investigated in this study, the majority of speech acts (8 out of 10) which were examined were self-initiated.

Based on the performance of the non-brain-injured adults, it was found that a battery of three contexts could be designed to elicit use of a range of speech acts. Further, these contexts could then be used as an efficient assessment tool to examine adult aphasic's speech act production. The contexts which involved familiar situations were somewhat structured in terms of both non-linguistic and linguistic variables and were presented within a relatively short period of time (45 minutes).

The results of the present investigation are in agreement with clinical impressions and research data reported by several other investigators (e.g., Holland, 1975; Wilcox and Davis, 1977; and Prinz, 1980). The present findings substantiate the observation that aphasic adults are able to produce a range of speech acts in order to convey a variety of communicative intentions regardless of etiology or degree of linguistic impairment. Results indicated that adult aphasics did not show a distinctive impairment in speech act production when compared to normal adults.

Although the aphasic subjects as a group did not express significantly more speech acts non-verbally as compared to the non-brain-injured subjects, one aphasic did produce a higher percentage of non-verbal acts than the other subjects. This appears to indicate that despite severe linguistic impairment, non-verbal strategies were occasionally employed to compensate for linguistic deficits.

Regarding implications for assessment and therapy, the naturalistic experimental contexts were found to elicit effective communicative exchanges between the clinician and the aphasic subjects. This type of communicative environment not only provides the clinician with needed information about the client's pragmatic abilities, but may actually facilitate the tendency to use language. This can be contrasted with the somewhat traditional testing format which may be less reinforcing and therefore, more inhibiting in terms of the use of language. Taking this one step further, it suggests that aphasiologists could use similar contexts for the purposes of assessing and/or remediating not only pragmatic deficits but linguistic deficits as well.

Although no speech act deficits were noted in the aphasics examined in the present study, it is possible that aphasics may demonstrate deficits in other areas of pragmatic ability. Certainly, subjects exhibiting a greater degree of linguistic impairment (i.e., severe-global impairment) might in fact demonstrate pragmatic deficits in the area of speech act production or in areas such as conversational skills.

Although the data collected during the experimental sessions augmented the transcriptions of the audio tapes by providing necessary non-verbal information, it is recommended that any future replication of this study include the use of video tape recording equipment especially if a second experimenter is not available to record non-verbal data.

In conclusion, the present investigation revealed that aphasic adults are able to verbally and non-verbally initiate a range of speech acts which convey a variety of communicative intentions. In addition, the present study described three naturalistic contexts which could be used by aphasiologists as (1) a device for assessing aphasic's speech act production, (2) as a starting point for pragmatically oriented aphasia therapy, or (3) as a means of incorporating traditional linguistic assessment and therapeutic procedures into more naturalistic communicative contexts.

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Appendix A

Description of Experimental Contexts

Context	Expected verbal/non-verbal communicative act	Trial	Materials	Circumstances	Experimenter's verbal cues
Prior to coffee context	(ODBM) Boundary Marker	1	None	Subject enters the room. Experimenter is seated at desk	None
Coffee context	(ASIR) Internal report	1	Items necessary to make coffee or tea.	Subject seated near experimenter. Ingredients for making coffee and tea are on the desk.	"Let's make some coffee or tea; I'd like to have tea".
	ASIR	2	None	Experimenter has just eaten a doughnut.	"I'm really stuffed".
	(ASDC) Description of location	1	2 teabags	Tea bags are situated so that subject can see them, but experimenter cannot.	"I can't find the teabags".
	(ASDC)	2	Crumpled paper towel	Experimenter begins cleaning up; looks around, but cannot find garbage can.	"I want to throw these away, but I can never find that garbage can.
	RQAC (Action Request)	1	Cup with boiling water	Experimenter gives subject cup of boiling water with no coffee, tea, or spoon within his reach.	None
	RQAC	2	Cup of black coffee or tea without milk.	Subject has a cup of coffee or tea. Sugar, milk, lemon are near experimenter and out of subject's reach.	"Please fix your coffee/ tea the way you like it".

Context	Expected verbal non-verbal communicative act	Trial	Materials	Circumstances	Experimenter's verbal cues
Coffee	ASEV	2	Doughnut	Experimenter has just taken a bite out of a doughnut. Subject is eating a doughnut. If subject has refused a doughnut, experimenter asks subject to taste hers.	"This doughnut is really stale".
	RSPR (Product Answer)	1	None	Experimenter and subject are drinking coffee/tea.	'Who do you know that makes a really good cup of coffee"? or 'Who in your house usually makes the coffee/tea"?
	RSPR	2	Box of doughnuts	Subject and experimenter each select a doughnut (or subject refuses to take a doughnut, but selects one for experimenter.	'What type of doughnut did you take"?
	RSCL (Clarification Response)	1	None	Experimenter pretends to misunderstand client's prior utterance.	'Who"?
	RSCL	2	None	Experimenter pretends to misunderstand client's prior utterance.	"Excuse me"?

Context	Expected verbal/non-verbal communicative act	Trial	Materials	Circumstances	Experimenter's verbal cues
Coffee	ODCQ (Clarification Question)	1	None	Experimenter mumbles a request for an item to be passed to her.	"Would you pass me the unintelligible"?
	ODCQ	2	Doughnuts	Experimenter has eaten a doughnut.	"I'm really unintelligible".
	RQPR (Product Question)	1	None	Experimenter requests an item which is not on the table.	"Please pass me the napkin".
	RQPR	2	Bakery box	Experimenter and subject discuss bakery where doughnuts came from. Subject does not know name or location of bakery.	"This bakery is really known for its cookies. If you ever want really good cookies, you should go there".
	PFPR (Protest)	1	Milk, sugar, cup of tea/ coffee.	Subject has fixed his coffee/tea to his liking. Experimenter begins to put more milk or sugar into subject's cup.	"Maybe you need some more_____".
	PFPR	2	Box of doughnuts	Subject has just either refused or eaten a doughnut. Experimenter offers subject another one.	"Here; have a doughnut".
	ASEV (Evaluation)	1	None	Experimenter and subject are drinking coffee/tea.	"I love to have coffee in the morning. I just can't get started without it; a cup of coffee is very nice in the morning".

Context	Expected verbal/non-verbal communicative act	Trial	Materials	Circumstances	Experimenter's verbal cues
Photo	ODCQ (Clarification Question)	1	Radio	A radio is playing very loudly. Experimenter begins to speak in a low voice.	None
	ODCQ	2	Photograph	Experimenter shows subject a photo of 2 people.	"This is my unintelligible".
	RQAC (Action Request)	1	Radio	Radio is playing loudly. Experimenter continues speaking in a low voice.	None
	RQAC	2	Purse containing wallet with photos.	Experimenter has promised to show subject some photos, but she takes them out of purse and does not show them to him.	None
	ASDC (Description of Location)	1	Purse	Purse is in subject's view, but not in experimenter's view.	"I need my purse". "I can't find it".
	ASDC	2	Calendar	Calendar is on floor next to subject.	"I'll be leaving soon, I can't remember the date". "My calendar was here a minute ago".

Context	Expected verbal/non-verbal communicative act	Trial	Materials	Circumstances	Experimenter's verbal cues
Photo	ASEV (Evaluation)	1	Photo of a cute infant.	Experimenter shows subject a picture of a cute infant.	"Here's my niece a few weeks after she was born".
	ASEV	2	Photo of a dog.	Experimenter shows subject a photo of a dog.	"Here's my dog".
	ASIR (Internal Report)	1	None	Subject and experimenter discuss photos.	"I love to take pictures of animals and children".
	ASIR	2	None	Air-conditioner is on, or window is open and room is cool.	"I feel cold".
	RSCL (Clarification Response)	1	None	Experimenter pretends to misunderstand subject's prior utterance.	"Excuse me".
	RSCL	2	None	Experimenter pretends to misunderstand subject's prior utterance.	"What did you say"?
	RSPR (Product Answer)	1	None	Experimenter and subject are discussing pictures.	"Who do you like to take pictures of most"?
	RSPR	2	None	Experimenter and subject are discussing pictures.	"What kind of camera do you have"?
	RQPR (Product Question)	1	Shopping bag and photo album.	Shopping bag containing a photo album is on the floor next to the subject. Photo album is concealed within the bag.	"Could you please hand me my photo album"?

Context	Expected verbal/non-verbal communicative act.	Trial	Materials	Circumstances	Experimenter's verbal cues
Photo	RQPR	2	Photo of a group of people.	Experimenter shows subject a photo of several people and identifies all of them except one person.	Names all persons in photo except one.
	PFPR (Protest)	1	Photo album	Experimenter has shown subject several pictures in the album and then abruptly begins to put it away.	"Oh, this must be boring for you. Maybe I should put it away".
	PFPR	2	Grape flavored bubble gum, raisins, black licorice candy.	Unusual food items are in dish on table. Experimenter offers each item to subject.	"Here, have some".
Daily Living	ASDC (Description of Location)	1	Basin, washcloth and soap.	A bar of soap is in front of basin within subject's view but not in experimenter's view.	"I need the soap".
	ASDC	2	Comb,mirror.	A comb is near the subject in front of the mirror.	"My comb should be around here somewhere".
	RQAC (Action Request)	1	Basin filled with water; towel.	Subject has just put some water on his face and experimenter is holding a towel.	"O.K. Would you dry your face?"

Context	Expected verbal/non-verbal communicative act	Trial	Materials	Circumstances	Experimenter's verbal cues
Daily Living	RQAC	2	A hair-brush in good condition, a badly worn out brush and a mirror.	Subject is seated in front of a mirror. Two brushes are near experimenter and out of subject's reach.	"Take what you'd use to fix your hair".
	ASIR (Internal Report)	1	Two brands of tooth-paste, tooth-brush.	Experimenter places two tubes of tooth-paste on the table in subject's view and then points to one brand of toothpaste.	"I really like this brand of toothpaste."
	ASIR	2	Two brands of mouth-wash, paper cups, a basin filled with water.	Two bottles of mouth-wash are placed in front of the subject. Experimenter points to one bottle.	"Here's some mouth-wash; I really like Listerine."
	RSPR (Product Answer)	1	None	Subject and experi-menter discussing dental hygiene.	'When was the last time you went to the dentist?"
	ODCQ (Clarification Question)	1	2 dental instruments.	Experimenter offers dental instruments to the subject and mumbles.	"Here, you can unintelligible".

Context	Expected verbal/non-verbal communicative act	Trial	Materials	Circumstances	Experimenter's verbal cues
Daily Living	ODCQ	2	Brush and comb	Subject has just brushed or combed his hair.	"Do you use unintelligible?"
	RQPR (Product Question)	1	2 unfamiliar dental instruments.	Subject and experimenter have just discussed items normally used by the subject in daily dental hygiene.	"Here, use these".
	RQPR	2	Bottle of aftershave cologne, with its label obscured.	Subject and experimenter have just discussed items used by the subject during and after shaving.	"Do they sell this brand in the canteen?"
	RSCL (Clarification Response	1	None	Experimenter pretends to misunderstand subject's prior utterance.	'What did you say?"
	RSCL	2	None	Experimenter pretends to misunderstand subject's prior utterance.	"Excuse me?"
	PFPR (Protest)	1	2 bottles of mouthwash.	Subject has indicated which brand of mouthwash he prefers; experimenter begins to pour the non-preferred brand into subject's cup.	"Here it is".

Context	Expected verbal/non-verbal communicative act	Trial	Materials	Circumstances	Experimenter's verbal cues
Daily Living	PFPR	2	1 brush in good condition; 1 brush in poor condition.	Experimenter is holding 2 brushes. Subject is asked to choose one brush to fix his hair. Experimenter then offers subject the brush which was not chosen.	None
	ASEV (Evaluation)	1	Bottle of mens' cologne.	Experimenter offers subject an open bottle of cologne to smell.	"I think that this smells very nice".
	ASEV	2	Mirror	Subject has just fixed his hair and is given a mirror.	"Here, take a look".
Immediately following Daily Living Context	ODBM (Boundary Marker)	2	None!	Subject is leaving room.	None.

Appendix B

Definition of Speech Acts

Assertives: report facts, state rules, convey attitudes, etc.

Description of location (ASDC): represents the location of objects or people. (Dore 1976, 1978). (ex. "It's over there").

Evaluations (ASEV): express personal judgments or attitudes. (Dore 1978) (ex. "She's cute").

Internal Reports (ASIR): express emotions, sensations, intents and other mental events (Dore 1978). (ex. "I don't like tea").

Requestives: solicit information or actions.

Action Requests (RQAC): seek the performance of an action by the hearer. (Dore 1978). (ex. "Pass me the milk").

Product Questions (RQPR): seek information relative to most "Wh" interrogative pronouns (Dore 1978) (ex. "Who's that?").

Performatives: accomplish acts (and establish facts) by being said.

Protests (PFPR): express objections to hearer's behavior. (Dore 1978). (ex. Clinician: "Here's some more coffee" -- Subject: "No Thank-Your").

Responsives: supply solicited information or acknowledge remarks.

Product Answers (RSPR): provide Wh-information. Complements preceding Wh-question. (Dore 1976, 1978) (ex. Clinician: "Who usually makes good coffee?" -- Client: "My wife").

Clarification Responses (RSCL): provide solicited confirmations. (Dore 1978). (ex. Clinician: "Excuse me" -- Subject: repeats or clarifies prior utterance).

Organizational Device: control personal contact and conversational flow.

Boundary Markers (ODBM): initiate or end contact or conversation (Dore 1976) (ex. "Hi!"; "Bye!").

Clarification Questions (ODCQ): seek clarification of prior remark: (Dore 1978) (ex. "Huh?"; "What?").

Appendix C

Rating Scale (adapted from Wilcox and Davis, 1981)

Score	Circumstances
0	Receiver has no idea as to the nature of the message;
1.	The message is not completely understood by the receiver;
2.	The message is conveyed after specific question feedback (e.g., What do you think of this?; Which one would you prefer?);
3.	The message is conveyed after general conversational feedback in which the message is repeated or rephrased;
4.	The message is conveyed on the first attempt.

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